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PENICILLIN IN THE TREATMENT OF DISCHARGE FROM THE MIDDLE EAR.

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NUMEROUS substances have been used, with varying success, in the treatment of discharge from the middle ear, and by no means least in importance has been the recently introduced penicillin.

Whilst I was working with Dr. G. C. Scantlebury, of Melbourne, penicillin was introduced to the 115th (Heidelberg) Military Hospital, and the majority of the records of the following cases of discharging ears were collected during that period. At that time, however, our interest was focused mainly on the effect of penicillin in sinusitis. It was largely due to Dr. Scantlebury's encouragement that both these series of cases were kept and recorded.

METHODS OF APPLYING PENICILLIN.

Three methods of applying penicillin in the treatment of discharging ears were used: (i) local application; (ii) intramuscular injection; and (iii) intramuscular and intrathecal injection.

The decision to use penicillin depended on whether a penicillin-sensitive organism was present in the discharge. Of these patients with middle-ear discharge, 40 were found to have penicillin-sensitive organisms and were treated with penicillin, and in 23 instances culture either yielded a penicillin-insensitive organism, or contained, in addition to the penicillin-sensitive organism, an organism whose growth was encouraged by the presence of penicillin. These patients do not include those suffering from acute otitis media which responded to the administration of sulphamerazine by mouth.

Local Application.

In the local application of penicillin, three methods were found to be effective: (a) penicillin drops; (b) penicillin displacement; (c) the administration of sulphamerazine by mouth, and the local application of penicillin.

The use of penicillin aural drops was favoured in those cases in which a large hole was present in the drum membrane. After a dry toilet of the affected ear, the drops were instilled every hour, with reasonable promise of the penicillin's reaching the middle ear. This is exemplified by Case I.

CASE I.—This patient complained of a discharge from the left ear, following the alleged removal of a grass seed from that ear ten months previously. Examination of the ear revealed a watery discharge and what appeared to be a foreign body in the postero-inferior part of the drum. The culture grown from the left ear contained both *Staphylococcus aureus* and *Staphylococcus albus* (both hæmolytic). The X-ray films of the sinuses were clear, whilst the film of the mastoids showed poor pneumatization of both sides, and on the left (the affected side), blurring of the cell outline and associated bony sclerosis were observed—an appearance consistent with chronic mastoiditis.

The treatment involved the removal of the grass seed from the middle ear through the existing hole in the drum and the instillation of penicillin drops. The ear was dry within three days. A month later the patient was reviewed and the ear was still dry and the perforation had almost closed.

Penicillin displacement was sometimes helpful in cases in which only a small perforation was found in the tympanic membrane. This entailed a dry ear toilet; the patient then lay on his side with the affected ear uppermost. This ear was then partially filled with penicillin solution (500 units per millilitre), and the nozzle of a small rubber bag (similar to a Politzer bag) was compressed and inserted into the affected ear. This exerted "suction" on the penicillin solution, then through the penicillin solution to the perforation of the drum, and so to the middle ear. Discharge materials and air were

drawn out of the middle ear, and when the "suction" was stopped by removal of the bag, the penicillin passed through the perforation in the drum, to replace the air and discharge material withdrawn from the middle ear.

If the perforation is very small, as in Case II, it is sometimes necessary to perform a paracentesis to establish drainage.

CASE II.—The patient, a child, aged twelve months, had had a discharge from the left ear for a month. Examination revealed a small perforation in the left drum and a purulent discharge in the auditory canal. The perforation was considered to be too small for adequate drainage, and it was decided to incise the drum membrane freely and to remove the adenoids carefully. The discharge ceased in three weeks, and when the patient was reviewed five months later the ear was still dry and the drum membrane intact.

In this instance no penicillin was used, and treatment depended solely on adequate drainage of the middle ear and removal of stasis in the nasal passages by adenoidectomy.

In cases in which acute *otitis media* had partially subsided in response to sulphamerazine treatment, but the aural discharge continued, penicillin drops were helpful if the discharge contained a penicillin-sensitive organism. The use of sulphamerazine by mouth and the local application of penicillin are illustrated by Case III, in which the response to sulphamerazine was incomplete.

CASE III.—This patient complained of pain in the right ear of ten days' duration, together with an intermittent discharge from the same ear over that period. On examination, the drum membrane was found to be inflamed, and the external auditory canal contained a watery discharge which yielded a culture of hemolytic *Staphylococcus aureus*, *Staphylococcus albus* and diphtheroids. The X-ray films of the mastoid sinuses indicated that they were well pneumatized on both sides and normal in appearance, whilst those of the accessory nasal sinuses showed that the right antral mucosa was moderately thickened.

The treatment commenced with a medium course of sulphamerazine, and in four days the ear was dry; but during the following week the discharge recurred, and as it had yielded a culture of *Staphylococcus aureus*, penicillin drops were instilled. Three days later the ear was dry, and after a further week's convalescence, the ear condition being satisfactory, the patient was discharged from hospital.

It was found that, if the discharge from the middle ear was going to stop in response to the local application of penicillin, it would do so within three or four days.

In six cases in which a penicillin-sensitive organism was present, *Bacillus pyocyaneus* appeared in the aural discharge, and the patients experienced pain and swelling in the external auditory canal after penicillin treatment. Case IV is an example of this phenomenon.

CASE IV.—The patient had had a discharge from the left ear intermittently since an attack of acute *otitis media* eighteen months previously. On examination a large tonsil remnant was found on the left side of his throat, and his nasal septum was deflected to the left. His left ear contained a profuse amount of mucus, and a moderate-sized posterior perforation was present. The culture from the aural discharge yielded hemolytic *Staphylococcus aureus* and non-hemolytic *Staphylococcus albus*. The X-ray films of the nasal sinuses were clear, whilst that of the left mastoid sinus showed it to be well pneumatized and the cells to be dull and sclerosed.

Treatment commenced with a medium course of sulphamerazine by mouth, and penicillin drops (1,000 units per millilitre) were instilled every four hours. Three days later the external auditory canal became painful and swollen, and the discharge was as profuse as ever. The penicillin drops were suspended immediately and a culture was prepared from the aural discharge. This indicated the presence of *Bacillus pyocyaneus* overgrowing non-hemolytic *Staphylococcus albus*. Various substances were used to dry the ear, but there was no diminution of the discharge, although the acute external *otitis* subsided when the penicillin treatment was discontinued.

Case V is a similar example of pain and swelling in the external auditory canal following penicillin treatment.

CASE V.—For four months this patient had had an intermittent discharge from the left ear, originally the result of a blast injury to that ear in 1918. On examination, his left ear was found to contain a watery discharge, the

drum membrane was inflamed, and a small polypus could be seen anteriorly. A culture from the discharge yielded hemolytic *Staphylococcus aureus*; the X-ray film of the sinuses revealed mucosal thickening in the right antrum, but on "proof puncture" the fluid returned was clear. The mastoid cells were of the pneumatized type, but on the left side the cells were dull and slightly sclerosed.

Penicillin drops were instilled every hour, a strength of 1,000 units per millilitre being used. On the fourth day the patient experienced pain in the left ear, and the canal was found to be swollen. The culture obtained from the ear at this stage yielded *Bacillus pyocyaneus* overgrowing a staphylococcus. In short, acute external *otitis* had developed, similar to that seen in the tropics associated with a growth of *Bacillus pyocyaneus*. However, within a week this responded to a mercurochrome and glycerin pack, and the ear was still dry after a further week's convalescence.

Both these cases are examples of a penicillin-sensitive organism being replaced or overgrown by *Bacillus pyocyaneus* after the local application of penicillin. There is still another instance of this in Case IX, in which, although penicillin was not applied locally, *Bacillus pyocyaneus* gained ascendancy over the preexisting *Staphylococcus aureus* after an intramuscular course of penicillin. Whether the *pyocyaneus* organism is responsible for certain types of acute external *otitis* it is not easy to determine; but the organism is present in about 70% of cases of external *otitis*.

Sinuses.

When a discharging ear was being treated, it was customary to investigate the condition of the sinuses by X rays, and if necessary, by proof puncture and by attempts at culture from the nasal discharge or from the antral washings. Of the 78 cases of middle-ear discharge, in 42 X-ray changes were found in the sinuses, and in 26 of these mucopus appeared in the antral washings.

If the sinuses are infected and the sinusitis is suitable for penicillin treatment, then any of the methods described in the article on penicillin in the treatment of infection of the nasal passages and sinuses, to be published shortly,⁽²⁾ may be effective. In that article an account is given of a series of patients treated with penicillin, together with the various methods adopted in applying penicillin to the affected sinuses.

Case VI is an instance in which penicillin alone failed to relieve either the sinus condition or the discharge from the middle ear.

CASE VI.—This patient said that she had had a discharging ear for only one week. She had undergone an operation for right radical antrotomy ten years previously. On examination, a large pad of adenoid tissue was found in the nasopharynx, there was a considerable amount of mucus in the left side of the nose, and a yellowish discharge was coming from her right ear. The left tympanic membrane was distorted and contained a small perforation, around which were granulations suggestive of chronic *otitis media* of long standing. The culture of material from the left side of the nose yielded a growth of a β -hemolytic streptococcus and some non-hemolytic *Staphylococcus aureus*, whilst culture of material from the ear also yielded a few colonies of a β -hemolytic streptococcus, but mainly hemolytic *Staphylococcus aureus*. The X-ray films of the sinuses revealed post-operative changes in the left antrum and an opacity of the left frontal sinus. The films of the left mastoid sinus showed it to be non-pneumatized, but no bone destruction had occurred.

Treatment consisted of the instillation of penicillin drops into the left ear, and the local application of penicillin to the sinuses. After three weeks' treatment the condition of the patient's ear and sinuses had not improved, and she was discharged from the army.

Tonsils and Adenoids.

In children, especially when the discharge from an ear is recurrent, the tonsils and adenoids should not be overlooked. It is just as important now that these be given due consideration as it was before the advent of penicillin.

CASE VII.—A child, aged three years, during the year 1944 suffered from scarlet fever accompanied by a discharging ear. The ear condition resolved in a fortnight, but the discharge recurred two years later. On this occasion, the culture from the discharging ear yielded a pneumococcus. Penicillin drops (500 units per millilitre) were instilled into the ear every hour for three days, by which time the

discharge had ceased. On examination of the patient, the tonsils and adenoids were found to be in a satisfactory condition; but it was considered justifiable to advise their removal should the discharge recur.

The importance of removing adenoids from children with recurrent aural discharge cannot be better illustrated than in Case III, mentioned previously, in which this condition was relieved by the removal of the adenoids and by adequate drainage of the middle ear. Penicillin was not employed in this case.

Intramuscular Injection.

The method of administering penicillin by intramuscular injection was reserved for two types of patient: (i) patients with acute *otitis media*: (a) those not responding satisfactorily to sulphamerazine by mouth, those whose aural discharge yielded a culture of *Staphylococcus aureus*, and those in whom mastoiditis was evident, and (b) those unable to be treated by sulphamerazine; (ii) patients with aural discharge following a fracture of the skull.

In cases of acute *otitis media*, the local reaction and oedema are too severe to allow the entrance of penicillin drops to the middle ear, so intramuscular injections of penicillin were employed. This meant that the drug was carried to the affected ear by the blood stream.

CASE VIII.—A female patient developed acute *otitis media* which did not respond to sulphamerazine. She was admitted to hospital suffering from an attack of scarlet fever, and twelve days later pain developed in the right ear. On examination, the drum membrane was found to be inflamed, the auditory canal contained a moderate amount of blood-stained discharge, and tenderness was present over the right mastoid process. Culture from the aural discharge yielded a growth of a β -hemolytic streptococcus and hemolytic *Staphylococcus aureus*.

Treatment commenced with a full course of sulphamerazine; but after a period of five days the acute *otitis media* had not responded satisfactorily. Since a hemolytic *Staphylococcus aureus* had been isolated from the aural discharge, the treatment was then supplemented by penicillin therapy. Injections of four millilitres of a solution containing 5,000 units per millilitre were given every three hours for the following six days. On the fifth day the discharge disappeared. However, the next day the ear was again slightly moist, and cultivation produced a scanty growth of hemolytic *Staphylococcus aureus* and a green-zoned streptococcus. The intramuscular injections of penicillin were continued for another four days, by which time the ear was completely dry. The patient's condition was reviewed after two weeks' convalescence, when the ear was found to be dry and the drum membrane intact.

In some cases of acute *otitis media*, sulphamerazine was not tolerated by the patient. Case IX is one example of this incompatibility.

CASE IX.—When this patient was admitted to hospital, he complained of a pain in the left ear present for two days and of a discharge from the ear for one day. On examination, the left auditory canal was found to contain a blood-stained discharge and the ear drum was inflamed. Both nostrils also contained sticky mucus. An X-ray examination of the sinuses showed that both antra were opaque, and there was a fluid level in the left; the left mastoid sinus was seen to be well pneumatized. The bony septal outlines were indistinct, but no definite bone destruction was seen.

A full course of sulphamerazine was commenced immediately, with the usual precautions of the keeping of a fluid chart and alkalization of the urine. On the fourth day the urine became blood stained and the patient experienced pain in the lower part of the abdomen and the middle of the back. Sulphamerazine treatment was discontinued, and the intravenous administration of "Soluvac" glucose and saline solution was instituted. Since a pure growth of hemolytic *Staphylococcus aureus* was isolated from the aural discharge, intramuscular injections of penicillin were substituted for the sulphamerazine. A "proof puncture" was performed on both antra. On the right side a moderate amount of mucus was returned, but attempted culture of microorganisms was unsuccessful. On the left side a large amount of mucus was produced, from which was grown a β -hemolytic streptococcus.

Four days after the commencement of intramuscular injections of penicillin, another aural culture was prepared, which indicated the presence of *Bacillus pyocyaneus*, hemolytic *Staphylococcus aureus* and a β -hemolytic streptococcus. Two days later, the external auditory canal became painful

and swollen. There was still a moderate amount of aural discharge, but in another three days (that is, nine days after the commencement of the intramuscular injections of penicillin) the middle ear ceased to discharge. However, the canal still remained slightly swollen and tender for another three days. The patient then convalesced for two weeks. At the end of that period the ear was dry, there was no swelling of the auditory canal, the drum membrane was intact, and "proof punctures" of the antra returned clear fluid on the right side and only a small amount of mucus on the left.

The other type of case in which it was considered preferable to use intramuscular injections of penicillin was that of fracture of the skull involving the middle ear. In these cases the local treatment had always been of a conservative nature, in order to avoid the introduction of infection, and had consisted almost entirely of dry swabbing of the external auditory meatus. Therefore, it is only reasonable to avoid the local application of penicillin in the treatment of a purulent aural discharge following a fracture of the base of the skull, because in an endeavour to eliminate a penicillin-sensitive organism, it is highly probable that one may introduce another organism which will not respond to penicillin treatment.

In the following two cases, Cases X and XI, a discharge from the middle ear followed a fracture of the skull.

CASE X.—The patient was admitted to hospital with a fractured skull. On examination of the patient, hemorrhage was occurring from both ears, and he was suffering considerably from shock. An X-ray examination of the skull revealed a linear fracture in the posterior portion of the left parietal bone, passing into the floor of the cranial cavity in the region of the base of the petrous temporal bone.

Fifty grammes of sulphapyridine were given by mouth during the next eight days, but the discharge from the right ear still persisted. A culture from the discharge yielded a growth of *Staphylococcus aureus*. Intramuscular injections of penicillin were then commenced, and 15,000 units were injected every two hours for the succeeding nine days, making a total of 1,325,000 units. Each day cultures were prepared from the discharge, and it was not until the fifth day after the commencement of penicillin therapy that the right ear became dry and the attempt at culture was unsuccessful.

In other cases of aural discharge treated by the intramuscular injection of penicillin, in which the discharge yielded a pure culture of *Staphylococcus aureus*, about the same period of time (namely, five to six days) was required for the production of a dry ear.

CASE XI.—When the patient was admitted to hospital, he was deeply comatose, his left ear was full of blood, and he had pin-point pupils. His left ear was reported to have discharged blood-stained material for seven days after his admission to hospital. The X-ray film revealed a small linear fracture of the occipital bone. The aural discharge became purulent fourteen days after his admission to hospital, and the culture yielded a pure growth of hemolytic *Streptococcus aureus*.

Intramuscular injections of penicillin were commenced sixteen days after his admission to hospital, and six days later the ear was dry.

Intramuscular and Intrathecal Injections.

The intramuscular and intrathecal routes for penicillin therapy were reserved for those cases of acute mastoiditis in which intracranial complications developed. In the three cases to be described, Cases XII, XIII and XIV, penicillin therapy and appropriate surgical procedures were unsuccessful. In Cases XII and XIII the penicillin did not reach the organisms successfully, though it might have done so had cisternal and ventricular puncture and the introduction of penicillin by this route been undertaken. In Case XIV the penicillin, though successful in disposing of the organism, failed to cure the patient.

CASE XII.—This patient first received treatment in the islands on March 5, 1944, for a profuse discharge from his left ear. This ear had been deaf for the past twenty-two years. An X-ray examination of the mastoid sinus, made on March 10, showed that the cells on the left side were cloudy and sclerotic. On the same day a culture from the ear yielded a growth of *Staphylococcus aureus* and a group A hemolytic streptococcus. Six days later the records

relate that a cortical mastoidectomy was performed, and cholesteatomatous material was removed from the mastoid antrum. At the time it was considered that the operation on the mastoid cavity should be converted to a radical mastoidectomy at a later date, and on March 27 the patient was transferred to the mainland. On April 13 he arrived at the base hospital, complaining of frontal headache and pain in the left ear, both present over the preceding week. He said also that he had been feeling drowsy for the past two days.

On examination of the patient, his left nasal cavity was found to contain a considerable number of nasal polypi, tenderness was present over the left frontal sinus, and his left ear was discharging profusely both from the auditory canal and from the mastoid wound. The next day an X-ray film was taken of his sinuses and mastoid cells, a lumbar puncture was performed, and his left antrum was "proof punctured". The X-ray film revealed a loss of translucency in all the sinuses, whilst that of his left mastoid sinus showed that only a few cells were present and that some bone absorption had occurred. On lumbar puncture clear cerebro-spinal fluid was obtained; it contained 120 cells per cubic millimetre, of which 80% were neutrophile cells and 20% were lymphocytes; the total protein content was 110 milligrammes per 100 millilitres, the globulin content was slightly increased, and the chloride content was 720 milligrammes per 100 millilitres. "Proof puncture" of the left antrum produced foul, offensive material.

Treatment commenced with a full course of sulphamerazine and the removal of the nasal polypi. A neurologist was asked to examine the patient, and it was his opinion that the evidence pointed to an intracranial spread of infection; but there was no indication of the site of this extension. He further stated that the pain of which the patient complained suggested trigeminal nerve involvement, as it extended down the jaw and felt like toothache.

On April 24 the left mastoid cavity was reopened and an overhanging ridge of bone was removed. Pus was obtained from a tract superior to the auditory canal, and running forward over the temporo-mandibular joint. About one square inch of inflamed, pulsating, granulating dura was exposed, resulting in a considerable extradural flow of pus. By April 29 the patient had been given 73 grammes of sulphamerazine, and his condition had not improved. Moreover, he had developed a slight squint when looking to the left. The culture grown from the aural discharge yielded haemolytic *Streptococcus aureus* and another haemolytic streptococcus.

Local penicillin treatment of the mastoid wound was commenced on April 29. A review of the patient's condition on April 30 showed that he had had a temperature of about 99° F. for the preceding fourteen days. On that date it was normal, but he was still complaining of frontal headache and toothache. His mastoid cavity was much cleaner, and the swelling in the region of the wound had diminished considerably.

The neurologist examined him again on May 1, and considered that the signs suggesting impairment of the temporal lobe had retrogressed since the evacuation of the extradural abscess; the obvious sixth nerve paralysis had almost disappeared, and the fundal signs suggested that the intracranial pressure had been raised since the last examination. The neurologist further stated that he considered the patient's condition had improved, and that there was no evidence of an intracerebral abscess. Another lumbar puncture was performed on May 1, and the cerebro-spinal fluid was still clear. That night the patient's temperature rose to 100° F., and he still complained of severe frontal headache. Therefore on the next day it was decided to give him an intravenous course of sodium penicillin, 100,000 units per litre of normal saline solution, and 200,000 more units to be given each day. On May 3 his headache was a little better, but his temperature rose to 102° F. and he was again drowsy. A blood film was then taken, but no malaria parasites were found. However, three doses of quinine were ordered, and after the second dose the headache had almost disappeared, and the next day he felt much better.

At this stage culture of material from the mastoid wound yielded a growth of *Bacillus pyocyaneus* and *Bacillus coli communis*. Although his general condition was good, his temperature remained at 102° F., and when a lumbar puncture was performed, it was found that although the cerebro-spinal fluid was opalescent, no culture could be grown from it. The fluid contained 204 cells per cubic millimetre, 81% being polymorphonuclear cells, and the protein content was 120 milligrammes per 100 millilitres.

The patient at this time was feeling well, and complained of only slight headache. The continuous intravenous penicillin therapy, which had been carried on for the past

four days, was suspended after a total of 800,000 units had been given. In its stead, intramuscular injections of penicillin solution (15,000 units per millilitre) were commenced. Lumbar puncture was again performed on May 7; the cerebro-spinal fluid was under a pressure of 80 millimetres and contained 320 cells per cubic millimetre, 32% being neutrophile cells and 68% mononuclear cells; the protein content was 60 milligrammes per 100 millilitres. On this occasion 10,000 units of penicillin were injected intrathecally.

The patient's condition remained uneventful for the succeeding twenty-four days, and it was considered at this stage that he might possibly have had cerebral malaria. However, he still complained of intermittent pain in the left side of his forehead, in the left side of his face, and in the teeth of the upper and lower jaws on the left side. On April 31 his temperature again rose to 99° F. and the aural discharge recommenced. Intramuscular injections of penicillin were continued; both antra were punctured, and the material returned from each side was cloudy, with numerous shreds. Both antra were irrigated, and after two more similar treatments, the material returned was clear. By June 14 the headache had disappeared and the mastoid wound was healing. The intramuscular injections of penicillin were then discontinued, after a total of 1,675,000 units had been given.

For the next fortnight the patient's condition remained comfortable. At the end of that period he again complained of pain in the left side of his face, and his temperature rose once more to 99° F. Intramuscular injections of penicillin were again commenced and continued for another two weeks. During that time his antra were washed out. At first the material returned from each side was cloudy, but after penicillin had been instilled on two occasions it was again clear. The culture from the antral wash yielded a growth of haemolytic *Staphylococcus aureus*.

After a further week severe pain developed in the left side of the head and in the back of the neck. Lumbar puncture produced turbid cerebro-spinal fluid at a pressure of 160 millimetres. This was reduced to 90 millimetres, and penicillin was again injected intrathecally. The next day the pressure of the cerebro-spinal fluid had risen to 230 millimetres, and the fluid was still slightly turbid. The pressure was reduced once more by removal of some of the cerebro-spinal fluid, and penicillin was injected intrathecally. Attempted culture still failed to produce a growth of organisms. By now the patient had had several attacks of vomiting, and it was decided to explore the mastoid wound again.

On June 22 the dura was exposed over the middle cranial fossa and over the posterior cranial fossa. Three needles were inserted into the temporo-sphenoidal lobe anteriorly, superiorly and posteriorly. The middle needle produced some fluid from the ventricle. Another needle was passed into the cerebellum, without result. A haemolytic streptococcus was grown on culture from the specimen obtained from the ventricle. Two days later another lumbar puncture was performed; the cerebro-spinal fluid was very turbid and the pressure was 300 millimetres, but again the fluid yielded no growth of organisms on attempted culture. The fluid contained 26,000 cells per cubic millimetre, 94% being polymorphonuclear cells and 6% lymphocytes. After the pressure of the cerebro-spinal fluid had been reduced, 15,000 units of calcium penicillin were injected intrathecally. However, the patient died that afternoon.

A post-mortem examination was carried out. The cranial cavity and upper surface of the tentorium appeared normal. About the base of the brain was a considerable amount of fibrinopurulent deposit; it extended also along the left trigeminal, auditory and facial nerves. The whole of the cerebellum was covered with the same fibrinopurulent deposit, and there was a considerable amount of thick, yellow pus in the subtentorial space. The fibrinopurulent deposit appeared to extend, although not markedly, through the *foramen magnum* and as far as could be seen down the spinal subarachnoid space. The ventricular system was not dilated and appeared normal except for occasional small petechiae in the white matter of the basal nuclei. Examination of sections of the cerebral hemispheres revealed no abnormal features. In the left lateral lobe of the cerebellum a small intact abscess about half an inch in diameter was found; it was about half an inch away and completely separated from the track apparently made by a needle. The parietal *dura mater* covering the left petrous temporal bone appeared intact. Pus was visible in the left internal auditory canal, and this appeared to be the source of the intracranial infection. Saw cuts made in the petrous temporal bone revealed no acute inflammatory changes except about the site of the recent operation. The apex of the petrous temporal bone was not affected by osteomyelitis.

The cerebro-spinal fluid encountered on removal of the brain was slightly turbid.

It was concluded that the patient had died from suppurative meningitis and cerebellar abscess following acute mastoiditis.

CASE XIII.—This patient complained of having had an intermittent discharge from the right ear for ten years, which had become more frequent during the last eighteen months. For eight days prior to his admission to hospital the discharge had been accompanied by pain in the ear, and during the next three days, both the pain and the discharge became suddenly worse. On examination of the patient, the septum was found to be deflected to the right. The right auditory canal contained pus, and a small polypus protruded from the perforation in the drum membrane. The aural discharge yielded a culture of *Staphylococcus aureus*, and an X-ray film of the right mastoid sinus showed dullness of the cells throughout and evidence of cellular destruction.

On the patient's admission to hospital, treatment commenced with a course of sulphadiazine by mouth. After two days, his temperature remained between 99° and 100° F., and the aural discharge was just as profuse as ever. Intramuscular injections of penicillin were commenced, and the same day it was decided to perform a cortical mastoidectomy operation. Cholesteatomatous material was removed from the mastoid antrum, and a small amount of pus was found. The day after the operation, his temperature rose to 101° F., and a lumbar puncture was performed. The cerebro-spinal fluid was clear, and no organisms could be grown from it. It contained 14 cells per cubic millimetre and 115 milligrammes of protein per 100 millilitres.

For the next three days his temperature continued to fluctuate between 100° and 103° F.; it gradually subsided during the following four days. He then had diurnal rises of temperature to 103° F. Again a lumbar puncture was performed, and the cerebro-spinal fluid returned was clear. On this occasion the cells numbered 111 per cubic millimetre, but of those 109 were red blood cells, and again the fluid was sterile.

The eye specialist was asked to report on the condition of the patient's retinae. He found slight blurring of the upper, lower and nasal margins of the disks on the right side, whilst on the left he could detect early papilloedema and some haemorrhage.

Another operation was performed on the mastoid sinus, and this time the lateral sinus was exposed and was found to be pulsating. Pus was found beneath the sinus plate, and a Bezold's abscess containing a considerable amount of pus was drained by removal of the tip of the mastoid process. Intramuscular injections of penicillin were continued. The temperature became normal and remained so for a week. During this period the patient felt particularly well. On the seventh day he had an uneasy feeling that "all was not well" with him. That night he had a severe headache. The following morning he was drowsy, and lumbar puncture was performed; but the cerebro-spinal fluid was still clear, only fourteen cells per cubic millimetre could be found, and the fluid was again sterile.

The next day the patient was again taken to the operating theatre. An exploratory needle was passed into the temporo-sphenoidal region, and a dilated ventricle was encountered containing fluid under considerable pressure. The posterior fossa was then explored, and a quantity of loculated pus was found, which later yielded a culture of a small Gram-negative bacilli. The fossa was then irrigated with penicillin solution, and the patient was returned to the ward. He died the next day.

In the two cases (XII and XIII) described above, penicillin failed to reach the organism and halt the progress of the disease.

By way of contrast, in Case XIV penicillin therapy cured the disease, but the patient did not live.

CASE XIV.—This patient was admitted to hospital suffering from acute *otitis media*, and with a previous history of chronic *otitis media* of some years' standing. However, after a course of sulphamerazine by mouth, the condition appeared to subside and the discharge ceased. In fact, the patient felt so well that he took it upon himself to leave his bed the day before he was due to become a convalescent patient. He collapsed and became unconscious, exhibiting pronounced neck retraction and rigidity. Lumbar puncture was performed and thick, purulent cerebro-spinal fluid was obtained, from which a pneumococcus was isolated. A mastoidectomy was performed, which disclosed a small amount of pus in the mastoid antrum, but no other abnormality. Penicillin was administered by intramuscular and intrathecal injection, and in addition sulphonamide

was given intravenously. The patient's condition gradually improved and the cerebro-spinal fluid became clear. He was experiencing momentary periods of consciousness when, suddenly, on the third day of the treatment, his temperature dramatically rose and he died.

Post-mortem examination revealed that the meningitis had completely resolved, and only a small bead of pus could be found in the internal auditory canal. There was absolutely nothing in any of the body's systems (and special attention was given to the region of the pons) to account for the dramatic rise of temperature, much less the patient's sudden death.

SUMMARY.

1. The response of a discharging middle ear to the local application of penicillin occurred within three to four days, whilst in the case of intramuscular injections of penicillin about five or six days were required for the production of a dry ear.

2. Forty of 63 patients with a middle-ear discharge were found to be harbouring a penicillin-sensitive organism.

3. Thirty of the 40 patients with a discharge from the middle ear, which yielded penicillin-sensitive organisms on culture, responded to penicillin treatment.

4. Six of the 40 patients treated with penicillin developed pain and swelling of the external auditory canal, associated with the appearance of *Bacillus pyocyaneus* in the aural discharge.

5. Forty-two of the 78 patients suffering from *otitis media* were found on examination to have radiological changes in the sinuses.

6. Twenty-six of the 42 patients with *otitis media* who had radiologically evident changes in the sinuses were found on "proof puncture" to have mucopus in their antra.

7. The intramuscular injection of penicillin was found beneficial in the following conditions: (i) acute *otitis media*: (a) patients not responding satisfactorily to sulphamerazine by mouth, harbouring a staphylococcus in their aural discharge, and obviously suffering from mastoiditis; (b) patients unable to be treated by sulphamerazine; (ii) aural discharge following a fracture of the skull.

8. Penicillin therapy in the treatment of intracranial complications of mastoiditis was disappointing.

REFERENCE.

¹ R. E. Dunn: "Penicillin in the Treatment of Infection of the Nasal Passages and Sinuses", *The Australian and New Zealand Journal of Surgery*, January, 1947, page 163.

ON THE TREATMENT OF PLACENTA PRÆVIA.¹

By JOHN CHESTERMAN,
Sydney.

READING recent medical literature, I found that in November, 1945, the Royal Society of Medicine in London held a discussion on *placenta previa*⁽¹⁾ and that the same subject was discussed at a meeting of the obstetric staff of the Women's Hospital, Melbourne,⁽²⁾ in March, 1946, so I feel that a review of the methods of treating this condition is not out of place tonight.

In Table I are collected together the results obtained at various hospitals in recent years. An analysis of the treatment employed in the case of the 225 patients admitted to the Women's Hospital, Crown Street, Sydney, forms the basis of this paper. You will notice that although the maternal mortality rate at this hospital is very low indeed, the foetal deaths are numerous. The best results have been obtained by Macafee at the Royal Maternity Hospital, Belfast, where, as part of the hospital policy, all patients suffering from ante-partum haemorrhage were allocated to him for treatment. The same policy has

¹ Read at a meeting of the Section of Obstetrics and Gynaecology of the New South Wales Branch of the British Medical Association on November 20, 1946.

TABLE I.
Placenta Prævia: Some Comparative Statistics.

Source.	Number of Cases.	Maternal Deaths.		Fœtal Deaths.	
		Number.	Percentage.	Number.	Percentage.
Eleven teaching hospitals in Great Britain (F. J. Browne) ⁽¹⁾	3,103	183	5.9	1,680	54.0
Women's Hospital, Melbourne ⁽²⁾ (1934 to 1944)	286	10	3.49	112	39.0
Royal Hospital for Women, Sydney ⁽³⁾ (1935 to 1946)	230	12	5.2	129	56.0
Women's Hospital, Crown Street, Sydney (1935 to 1946)	225	2	0.9	120	53.0
C. H. Macafee (Belfast) ⁽⁴⁾ (1937 to 1945)	191	1	0.52	42	22.0
Leonard Phillips (Queen Charlotte's Hospital) ⁽⁵⁾ (1933 to 1938)	143	2	1.4	84	58.7
Josephine Barnes ⁽⁶⁾ (University College Hospital) (1927 to 1944)	140	4	2.9	72	52.2

been followed for many years at Queen Charlotte's Hospital, and Leonard Phillips's series of 143 cases shows the results of his own care. Observe that his cases were in an earlier period (1933 to 1938) than those of most of the others. The fœtal mortality rate is high in his cases, but Phillips⁽⁵⁾ in presenting them said that he was trying to obtain good results as far as the mother was concerned, more or less ignoring the fœtus, and by using obstetric methods other than Cesarean section. (Only 10% of babies were thus delivered, compared with 31% at the Women's Hospital, Crown Street, and 40% in Macafee's series.)

It has been said that the more babies one saves, the greater is the maternal mortality, and looking at the figures from the Women's Hospital, Crown Street, and Queen Charlotte's Hospital it would seem that the converse is also true—that by concentrating on the mother an undue number of babies are lost. Nevertheless, Macafee (and others) have shown that improved chances of survival are possible for both mother and baby. I have analysed our methods of treatment at Crown Street to see if by the use of different methods we might have decreased the fœtal mortality rate without increasing the maternal mortality rate.

The clinical histories of all patients at Crown Street recorded as suffering from *placenta prævia* during the past eleven years have been carefully examined and a small number have been excluded from this series because definite evidence of a low-lying placenta was lacking from the history. No case in which maternal or fœtal death occurred was excluded. The *placenta prævia* is classified as lateral if the placenta occupied in part the lower uterine segment, marginal if it came to the edge of the internal os, and central if it completely covered the internal os at the onset of labour.

MATERNAL DEATHS.

Before I discuss methods of treatment a short history will be given of the two maternal deaths.

CASE I.—E.F., aged twenty-seven years in 1939, had three living children and had had two miscarriages. She was admitted to hospital with pyelitis in the sixth month of her sixth pregnancy. She did not respond well to alkali and sulphonamide treatment, and drainage by ureteral catheterization was instituted. Some five weeks after her admission to hospital she suddenly had a severe hæmorrhage. She was given a blood transfusion and morphine and the bleeding ceased. Two days later she came into labour with further hæmorrhage. The presence of a marginal *placenta prævia* was diagnosed by vaginal examination. The membranes were artificially ruptured and Willett's scalp traction forceps applied. A living child weighing two pounds six ounces was delivered. During the puerperium the patient was persistently febrile from the eighth day onwards; attempted culture of micro-organisms from the blood gave negative results. On the sixteenth day she had a severe secondary hæmorrhage. The uterus was explored and placental debris was removed, but death occurred later the same day. This patient had a very poor blood picture during the puerperium, and she signed her death warrant by persistently refusing blood transfusions until it was too late.

CASE II.—F.F., aged twenty-four years, was in her second pregnancy at about thirty-two weeks (1941). She was

admitted to Crown Street from a private hospital, exsanguinated and semi-conscious. An attempt at packing the vagina had been made before her admission to hospital. There was very little hæmorrhage *per vaginam*, and no fœtal heart sounds were heard. She was given gum saline solution, 1,000 millilitres intravenously, followed by a blood transfusion, and a firm binder was applied. About nine hours after her admission to hospital her condition had improved considerably, but she was still not conscious. Vaginal examination revealed a central *placenta prævia*. The placenta was perforated with fingers, and as the breech was presenting, a leg was brought down. Little hæmorrhage occurred with the delivery of the baby and the placenta. The patient's pulse and colour were satisfactory. Eight hours later she was still unconscious and her temperature had risen to 102° F. Just before her death, which occurred seven hours later, the temperature had risen to 106° F. She had been given three litres of blood since her admission to hospital. Post-mortem examination revealed no evidence of cerebral thrombosis or hæmorrhage in any area; but there was an area of necrosis in the anterior lobe of the pituitary gland.

The first of these patients would certainly have survived had she been more reasonable or had we been more insistent on blood transfusion, and her death is scarcely related to the *placenta prævia*. On reading the history of the second, I wondered if interference was undertaken too soon, although it is probable that recovery from the extreme exsanguination was impossible in any circumstances.

METHODS OF TREATMENT.

Before discussing the fœtal mortality rate in this series of cases I shall refer briefly to the methods of treatment that are available.

Watchful Expectancy.

Writing as lately as 1940, DeLee⁷ agrees with the dictum of one of his early teachers: "There is no expectant treatment of *placenta prævia*—empty the uterus at once." He states that any exception to this is an "excessive rarity". Many obstetricians would not agree with this. If active treatment to empty the uterus is started at the first hæmorrhage, many premature or non-viable infants will be delivered with little chance of survival. By waiting when possible, one gives the infant a chance of attaining reasonable maturity. To follow a method of watchful expectancy, it is absolutely essential for the patient to be in a well-equipped hospital where active treatment can be given at a moment's notice. No vaginal examination should be made until a more serious hæmorrhage or repeated hæmorrhages make it imperative, and everything must be ready to treat whatever condition is found at examination.

In those cases in which the fœtus either is dead or is alive and reasonably mature, there is no need for this delay, and the uterus should be emptied as soon as the patient's condition allows it, by the methods to be described shortly.

Non-interference during Labour.

Hæmorrhage from a laterally situated *placenta prævia* is often controlled by the onset of labour, and no further treatment is necessary; patients treated expectantly may

continue with pregnancy, come into labour and need no further treatment, because the contracting uterus drives the presenting part of the fetus on to the site of the hemorrhage.

Active Methods of Treatment.

The first types of active methods of treatment are those which control hemorrhage by exerting pressure on the portion of the placenta attached to the lower uterine segment; they are the following: (i) artificial rupture of the membranes; (ii) the application of Willett's scalp traction forceps, to which a weight is attached; (iii) the use of a vaginal pack (alone or followed by another procedure when the os is sufficiently dilated); (iv) compression of the placenta by the half-breech; (v) the introduction of a hydrostatic bag.

The second type of active treatment is Cæsarean section.

FETAL MORTALITY.

Two important factors which increase the fetal mortality rate in hospital practice are, firstly, the number of premature infants born, and secondly, the number of patients in whom fetal heart sounds are not heard at the time of admission to hospital. Vaginal examination or unnecessary attempts at vaginal packing before a patient is sent to hospital may have caused further separation of the placenta and consequent fetal death. In this series, of the 120 dead babies (75 stillbirths and 45 neonatal deaths) no fetal heart sounds were heard on the mother's admission to hospital in 31 cases, and 17 of the infants that died after delivery were under four pounds in weight. After allowance is made for these the fetal mortality rate among those capable of surviving is 42%, which is still a high rate. As might be expected, the best results were obtained when lateral *placenta prævia* was present (38% of fetal deaths) and the next best when the *placenta prævia* was centrally placed (57%), because of the higher incidence of treatment by Cæsarean section. The highest mortality rate occurred when the marginal variety was present, because this type called for more interference from below.

ANALYSIS OF TREATMENT.

I now come to an analysis of the treatment used at Crown Street in 56 cases of central *placenta prævia*, 88 cases of marginal *placenta prævia*, and 81 cases of lateral *placenta prævia*. The first thing to note is that the hydrostatic bag was not used at all. Neither was it used by Macafee, nor in the cases at Queen Charlotte's Hospital, nor in the cases at University College Hospital, referred to in this paper. F. J. Browne⁽¹⁾ states that a De Ribes bag should never be used. On the other hand, Stander⁽²⁾ states that "almost ideal results" are obtained in the lateral and marginal varieties of *placenta prævia* by the introduction of a bag after rupture of the membranes and if the cervix is sufficiently dilated to admit two fingers.

In the New York Lying-In Hospital⁽³⁾ (1932 to 1940) a bag was used in 31.8% of cases and Cæsarean section in 40.7%. The fetal mortality rate in all cases was 22.1%. You will see shortly that the procedure of pulling down a leg to use the half-breech as a plug carries such appalling fetal mortality that perhaps the use of a hydrostatic bag as an alternative would give better results in some cases.

No Special Treatment.

The group in which no treatment other than that associated with delivery (for example, application of forceps) was necessary (see Table II) comprises those cases in which the pressure of the presenting part on the placenta, by reason of the uterine contractions of labour, was sufficient to control hemorrhage. Some of the patients were in labour on their admission to hospital and others came into labour spontaneously while being treated by "watchful expectancy" with everything ready to treat a sudden hemorrhage. In more than one-third of the cases of lateral *placenta prævia* no further treatment was required and the fetal mortality rate was low.

Vaginal Packing.

In seven cases vaginal packing was employed, with no subsequent treatment. There were five fetal deaths.

Artificial Rupture of the Membranes.

If the patient is in labour and if hemorrhage is still occurring and the placenta is not lying centrally, artificial rupture of the membranes (Table III) is often all that is necessary. At the same time a tight binder is applied over the fundus to help push down the presenting part. The results obtained are about the same as in cases in

TABLE II.
No Special Treatment.

Type of Placenta Prævia.	Number of Cases.	Number of Fetal Deaths.
Central (total of 56 cases)	1	1
Marginal (total of 88 cases)	18	12
Lateral (total of 81 cases)	30	9
Total (225 cases)	49	22

which no interference is required. I am doubtful whether the membranes should be artificially ruptured unless labour has started, except as a preliminary to the application of Willett's forceps.

If hemorrhage is occurring and the uterus is not contracting, will artificial rupture of the membranes lead to control of the bleeding? If hemorrhage is not occurring there is no need to rupture the membranes.

The Application of Willett's Forceps.

Willett's forceps (Table IV) can be applied to the scalp through a cervix dilated to admit one finger, as is usually the case in a *multipara*. In this series the fetal mortality rate was high (65%). In Macafee's series it was 42%.

Summing up these three relatively simple methods of treatment, we find that they were employed in 100 cases (nearly half the total) with a fetal mortality rate the

TABLE III.
Artificial Rupture of the Membranes.

Type of Placenta Prævia.	Number of Cases.	Number of Fetal Deaths.
Central (total of 56 cases)	0	0
Marginal (total of 88 cases)	12	7
Lateral (total of 81 cases)	7	2
Total (225 cases)	19	9

same as the average of the whole series. They were used in four cases of central *placenta prævia* with no live babies. The high fetal death rate in the 47 cases of marginal *placenta prævia* (about 70%) suggests that in some of them at least other methods of treatment might have given better fetal results without increasing the maternal risk too much.

Plugging with the Half-Breech.

The group of patients treated by plugging with the half-breech includes all those in whom a fetal leg was pulled down for the purpose of controlling the hemorrhage (Table V). In some instances the breech was presenting, in others the manœuvre was preceded by external version or by bipolar or internal version. Whatever the procedure, the fetal mortality rate was extremely high (91%). In all reported series this method of treatment is associated

with a very high foetal loss, but it has not been employed so frequently by some.

I have analysed the histories of this particular group of patients to find out whether the decision to pull down a leg was made because of non-viability of the foetus or of its death *in utero*. These conditions were apparently the deciding factors in half the cases; but in the 16 cases of central *placenta prævia*, 11 of the babies weighed over four pounds and the foetal heart sounds were audible before the treatment was applied. The same foetal condition applied in seven cases of marginal and in five of lateral *placenta prævia*. In cases such as these I think we have been too conservative in regard to treatment by Cæsarean section.

TABLE IV.
Application of Willett's Forceps.

Type of <i>Placenta Prævia</i> .	Number of Cases.	Number of Foetal Deaths.
Central (total of 56 cases)	3	3
Marginal (total of 88 cases)	17	13
Lateral (total of 81 cases)	12	5
Total (225 cases)	32	21

Because of the foetal loss associated with breech extraction, I do not think this method should be used unless the foetus is already dead or non-viable, or in an emergency to control severe hæmorrhage. If the foetus is alive and viable, Cæsarean section is a better alternative in many cases, and the results obtained by Stander by the use of a bag (in 31% of his cases) provide food for thought.

Cæsarean Section.

It is seen from Table VI that Cæsarean section gives the best result for the baby, and in this series it has been safe for the mother. In recent years consensus of opinion has been swinging steadily in favour of Cæsarean section, to such an extent that at the discussion by the Obstetric Section of the Royal Society of Medicine,⁽⁴⁾ referred to earlier, authorities such as Professor Munro Kerr and F. J. Browne agreed that, provided the foetus

TABLE V.
Plugging with the Half-Breech.

Type of <i>Placenta Prævia</i> .	Number of Cases.	Number of Foetal Deaths.
Central (total of 56 cases)	16	16
Marginal (total of 88 cases)	18	16
Lateral (total of 81 cases)	13	11
Total (225 cases)	47	43

was alive and viable, one of two methods of active treatment should be adopted—namely, rupture of the membranes (if good contractions were present) or Cæsarean section. This does not mean rushing to operate at the first hæmorrhage, but acting as circumstances dictate after a period of expectant treatment.

Much can be said for and against Cæsarean section in the treatment of *placenta prævia*, and there is not time to say it on this occasion; but I want to make the following points. (i) The large majority of these patients are *multipara*, and consequently a scar in the uterus is of less importance than in a *primigravida*. (ii) In capable hands, and with free use of blood transfusions and chemotherapy, the risk of Cæsarean section to the mother may be less than the risk of vaginal and intrauterine manipulation. (iii) The shock, blood loss and risk of

infection unavoidable in penetrating the placenta to pull down a leg can be great. The cervix is likely to be torn, with increased likelihood of post-partum hæmorrhage. (iv) I think that in this series of cases more Cæsarean sections could have been performed without an increase in the number of maternal deaths. As you will see in a moment, the incidence of Cæsarean section at Crown Street has not varied during the past eleven years.

Type of Operation.

In this series the classical operation was used in practically every case. In the last few years an occasional lower segment operation has been performed. In one case hysterectomy was required because of persistent hæmorrhage, such a case providing yet another instance of the necessity of combining sound gynaecological technique with obstetric knowledge.

In my own cases the classical operation has been favoured, as I have always felt worried about finding the placenta beneath the incision in the lower uterine segment.

Macafee⁽⁵⁾ prefers the lower segment operation. If the placenta is suspected to be lying anteriorly, he begins the uterine incision with a careful but not deep stab through the lower uterine segment and placenta into the uterine cavity. This allows a finger to be introduced into the uterine cavity, and so facilitates the rapid enlargement of the uterine wound, to allow extraction of the child with the minimum of delay.

TABLE VI.
Cæsarean Section.

Type of <i>Placenta Prævia</i> .	Number of Cases.	Number of Foetal Deaths.
Central (total of 56 cases)	34	10
Marginal (total of 88 cases)	19	5
Lateral (total of 81 cases)	17	3
Total (225 cases)	70	18

The anaesthetic used should be one which causes the least uterine relaxation, thereby reducing the amount of blood lost. Local anaesthesia does this; but Macafee⁽⁶⁾ considers it too great a mental strain for the patient, and it does not permit rapid operation, which may be necessary in the presence of hæmorrhage. This has been my own experience, and I prefer local anaesthetic infiltration of the abdominal wall down to and including the incision of the peritoneum. "Pentothal Sodium" is then given intravenously. The access to and the opening of the uterus are thus made rapid and easy, and the infant can be extracted before it has been affected by the "Pentothal". The uterine muscle contracts well, and the patient does not need much "Pentothal" because the abdominal wall is still locally anesthetized for its closure.

TRENDS IN TREATMENT.

Table VII has been prepared in order to show whether a trend towards any particular mode of treatment has taken place during eleven years. In the first six years there were 109 cases, and 116 in the second five years; thus there is a firm basis for comparison between the two periods. There was one maternal death in each group, and the foetal mortality rates are almost identical in each group.

Vaginal packing has rightly lost favour, and more patients have been treated expectantly during the second period, whereas the incidence of treatment by Cæsarean section and that of plugging with the half-breech have remained remarkably constant throughout.

The number of blood transfusions has more than doubled, many patients now receiving two or three transfusions. Blood transfusions have been the main reason

for lowered maternal mortality rate in *placenta prævia* in most centres in England and America, and its frequent use at Crown Street during all this period of eleven years may be largely the reason for a low death rate. Blood transfusion should be given before and during the period of active treatment and immediately after delivery when indicated.

SUMMARY OF MANAGEMENT OF PLACENTA PRÆVIA.

1. A patient with ante-partum hæmorrhage should be sent as soon as possible to a well-equipped hospital. A firm binder should be applied and the patient should be given a hypodermic injection of a quarter of a grain of morphine. No vaginal examination should be made, nor should the vagina be packed. In the rare case in which hæmorrhage is severe enough to force active treatment, an attempt should be made to arrange for a blood transfusion forthwith. In such a case, if no cervical dilatation has occurred, vaginal packing must be used; if the patient is a *multipara* and the placenta is felt through a partly dilated os, the bringing down of a leg is the best emergency method of controlling the hæmorrhage.

TABLE VII.

Method of Treatment.	1936 to 1941 (109 Cases.)	1941 to 1946 (116 Cases.)
Expectant	19	32
Artificial rupture of the membranes	6	13
Application of Willett's forceps	23	10
Cæsarean section	34	36
Plugging with the half-breech	24	21
Vaginal packing	22	4
Blood transfusion	22	47
Fœtal mortality	Lived, 51; died, 58	Lived, 54; died, 62

2. On the patient's admission to hospital her blood should be typed and arrangements made so that a blood transfusion can be given at short notice if necessary. The absence of pain or uterine tenderness, a high presenting part and no evidence of toxæmia make a tentative diagnosis of *placenta prævia* possible. No vaginal examination should be made unless the severity or persistence of hæmorrhage demands active treatment.

3. Unless the baby is already dead, an expectant attitude can be adopted, the patient being kept strictly in bed.

4. When subsequent hæmorrhage indicates active treatment, the patient should have a vaginal examination in the operating theatre, everything being prepared to carry on whatever treatment is considered necessary after the examination. Macafee considers that the decision to make the examination should be made by someone who has experience and is prepared to carry on with the treatment.

5. If at the time of the examination the infant is alive and reasonably mature, Cæsarean section would seem to be justified if the following conditions are fulfilled: (a) if the *placenta prævia* is central; (b) if severe hæmorrhage is present, the cervix being closed and labour pains absent; (c) if the patient is an elderly *primigravida*; (d) if the patient is a *primigravida* with lowered fertility; (e) in some cases, if the *placenta prævia* is marginal and is situated on the posterior wall; in this situation the thickness of placenta over the promontory of the sacrum is likely to interfere with the descent of the head, and it does not so easily compress the bleeding point.

6. If the placenta is not over the internal os and the patient is in labour the membranes should be ruptured.

7. Marginal *placenta prævia* associated with the dilatation of a multiparous cervix may be treated by the application of Willett's forceps or by version and the bringing down of a leg. Both these methods are associated with a high fœtal mortality rate, and I wonder if this is the type of case in which a hydrostatic bag might be useful.

8. If the fœtus is dead or not viable, the choice of procedures is not so restricted. Some authorities consider

that Cæsarean section is justified in these circumstances if the placenta is centrally situated, if the patient is not in labour and if the cervix is not dilated.

ACKNOWLEDGEMENTS.

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REFERENCES.

- (1) F. J. Browne: "Ante-Natal and Post-Natal Care", Sixth Edition, 1946, page 244.
- (2) Report of a meeting of the obstetric staff of the Women's Hospital, Melbourne, THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, September 21, 1946, page 425.
- (3) Clinical Reports, Royal Hospital for Women, Sydney.
- (4) Discussion on Placenta Prævia, *Proceedings of the Royal Society of Medicine*, Volume XXXIX, July, 1946, pages 551 et sequentes.
- (5) *Proceedings of the Royal Society of Medicine*, Volume XXXIX, July, 1946, page 552.
- (6) *Proceedings of the Royal Society of Medicine*, Volume XXXIX, July, 1946, page 554.
- (7) J. B. DeLee and J. P. Greenhill: "The 1940 Year Book of Obstetrics and Gynecology", page 15.
- (8) H. J. Stander: "Williams' Obstetrics", Eighth Edition, 1941, page 1064.
- (9) C. H. G. Macafee: "Placenta Prævia: A Study of 174 Cases", *The Journal of Obstetrics and Gynecology of the British Empire*, Volume LII, August, 1945, page 313.

PERIPHERAL VENOUS THROMBOSIS: PREVENTIVE MEASURES AND TREATMENT.¹

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I was influenced in my choice of subject for this paper by the facts that the condition of thromboembolism is one that should be of interest to every practising member of the medical profession, and that while considerable attention has been drawn to this subject in recent years in overseas medical publications, there have been few references to it in Australian medical literature. Much of my subject matter is contentious; but I hope to be able to impress on you the necessity of becoming "pulmonary-embolism minded", and as every pulmonary embolism presupposes a preexistent thrombosis, just as every lethal bullet requires a rifle, we must constantly be on the lookout for this partner in crime. Preventive measures must be constantly in our mind if we hope to diminish the incidence of venous thrombosis; but if this condition should arise, our best chance of successful treatment depends on early diagnosis of the clotting process, and this goal will be attained only by routine interrogation of our patients and by frequent careful examination of the lower limbs.

HISTORICAL SURVEY.

A century has elapsed since Virchow in the year 1846 first established the embolic origin of the clot in these cases. He also showed that gross inflammatory changes in the vessel walls were not essential for thrombosis to occur. In the latter part of the century Kahn studied the macroscopic and microscopic appearance of the thrombus. Aschoff, who made a careful study of this subject early in this century, held that the initial sites of the thrombi responsible for pulmonary emboli were in the pelvic, iliac or femoral veins, and that only in these circumstances could emboli be large enough to block the pulmonary arteries and produce a fatal result.

In the last two decades attention has been drawn to the theory that the peripheral veins of the leg could be responsible for harbouring the initial clot. Denecke, of Germany, in 1929, is credited with being the originator of this theory, which has subsequently been confirmed by the

¹ Read at a meeting of the South Australian Branch of the British Medical Association on November 28, 1946.

work of Rossle in Germany and of Hunter⁽¹⁾ and his associates in America. The last-named workers carried out a routine dissection of the veins of the lower limb at 200 consecutive autopsies. They concluded that most thrombophlebos began in the peripheral veins of the calf and foot, and found evidence of leg clots in 50% of the cases. This fact is not surprising when we remember the frequency with which evidence of phleboliths is seen in radiographs of the bony pelvis.

It would seem probable that most pulmonary emboli arise from clots in the lower leg veins and that when massive pulmonary embolism occurs the thrombosis has extended from these veins to the larger veins of the thigh and pelvis. In only a small percentage of cases (5% according to Allen⁽²⁾) is the thrombosis confined to the smaller pelvic veins.

INCIDENCE OF PERIPHERAL VENOUS THROMBOSIS AND PULMONARY EMBOLISM.

In the last 6,000 post-mortem examinations conducted at the Royal Adelaide Hospital there have been 90 cases (1.5%) in which massive pulmonary embolism was considered to be the cause of death. Add to this number the numerous clinical examples of lethal and non-lethal pulmonary emboli that occur in patients in hospital who do not come to autopsy, and it will be apparent that this is a comparatively common condition. The primary venous thrombosis which is responsible for embolic spread to the lungs is associated with a high mortality rate and some morbidity.

In 1922 Cleland and Barlow⁽³⁾ drew attention to the comparatively high incidence of massive pulmonary embolism in South Australia. They mentioned it as a cause of death in 2.5% of a series of autopsies at the Royal Adelaide Hospital, and quoted American records, in which the incidence was given as only 0.3% in all post-mortem examinations; they concluded that the condition must be more common in Adelaide. Our friends across the water have evidently taken their challenge to heart, for in a recent report McCartney,⁽⁴⁾ of Minneapolis, gives an incidence of 2.67%.

I do not think there can be any doubt that many patients in the past, considered to be suffering from post-operative pneumonia, when symptoms became manifest after the third day, have been suffering from pulmonary infarction—what is often loosely described as a touch of pleurisy is much more likely to be a dash of embolism—and also that many cases of so-called coronary occlusion have in reality been cases of pulmonary embolus.

The high morbidity rate associated with peripheral venous thrombosis is stressed by Bauer,⁽⁵⁾ of Sweden. According to him, in approximately 80% of cases of thrombosis of the larger deep veins of the leg and thigh ulcers develop and in every case there is permanent residual oedema of the affected limb. I think the experience of most clinicians must be in accord with these figures, and also that they will agree with Bauer's statement that the average patient's illness with a "white leg" has in the past extended over a period of several weeks.

In view of the number of cases of thromboembolism which occur, it is not surprising that a formidable literature has appeared on this subject with varying views on its pathology and preventive treatment.

We are all familiar with the risk of embolism following surgical operations, childbirth and trauma; but it is not so well appreciated that the condition is by no means uncommon in non-surgical cases. The one common denominator, as Hunter states, is confinement to bed—the reason for decubitus is unimportant.

A striking feature in the incidence of thromboembolic disease is the influence of age—the condition is rare in early life, but increases in frequency with advancing years (see Figure I).

Unfortunately, in the present state of our knowledge, we do not know the factor actually responsible for the initial thrombosis, which may extend and eventually break loose and reach the pulmonary arterial tree. It is generally

accepted that slowing of the peripheral circulation, damage to the endothelial lining of the veins—traumatic, toxic or thermal in origin—and changes in the composition of the blood are potential causes of thrombosis. With regard to the last-mentioned, I must refer to the valuable experimental work of Trethewie,⁽⁶⁾ from the Institute of Medical and Veterinary Science, Adelaide. He found that whereas certain organs—liver, lung, kidney and spleen—endow perfused blood with anticoagulant effects, the opposite occurs when the hind legs and pelvis are similarly perfused, the blood in these cases being more coagulable after perfusion than before.

We have examined the in-patient case records of these conditions at the Royal Adelaide Hospital over a period of fifteen years from 1931 to 1945 inclusive, a total of 426 cases. There were 235 cases of thrombosis of leg veins (see Table I). Over the same period there were 245 cases of pulmonary embolism (see Table II). The mortality rate of 12% from pulmonary embolism in cases of leg

Number of Cases

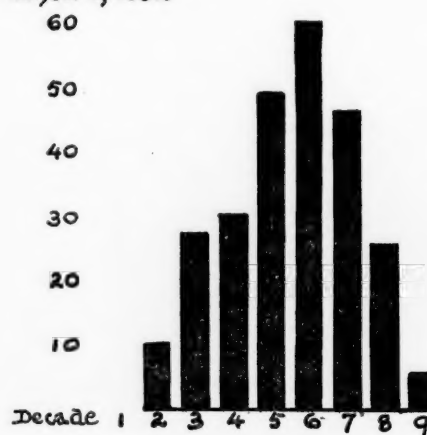


FIGURE I.

Age incidence in decades in 249 cases of pulmonary embolism.

thrombosis in this series compares with 16.6% in Bauer's series and 18.3% in the Mayo Clinic statistics of Barker *et alii*. It will be appreciated that the figure of 24% mentioned in Table I as the percentage of cases of pulmonary embolism in which limb thrombosis was recognized is obviously far too low, the inference being that in many of these cases the causative thrombosis was not suspected, or if it was recognized it has not been noted in the case records. During this period of fifteen years approximately 53,000 surgical operations were performed and the incidence of fatal pulmonary embolism was 0.3%.

SIGNS AND SYMPTOMS OF PERIPHERAL VENOUS THROMBOSIS.

For descriptive purposes we may distinguish two types of case of peripheral venous thrombosis (Figure II); but it must be appreciated that all gradations and combinations of the two types may occur. The two types are as follows: (a) cases associated with inflammatory changes in the wall of the vein and an adherent clot; (b) cases unassociated with inflammation, in which the thrombus is unattached—the so-called "bland thrombosis" of Oschner and deBakey; this type is by far the more dangerous, as the clot lies loosely in the venous channel and is likely to be whisked off and to result in a pulmonary embolus.

The first type is often seen in association with varicosities, as a thrombophlebitis of the superficial venous system and also more importantly in "white leg", the underlying pathology in this case being thrombophlebitis of the larger veins of the thigh and leg. The second type

affects the intermuscular or deep veins of the calf and plantar group of the foot.

In superficial or saphenous thrombophlebitis the inflamed and clotted vein is visible and palpable and should present no difficulty in diagnosis. While the signs and symptoms of the fully developed "white leg" are familiar to all, the earlier manifestations of the condition are not so readily detected. Early symptoms are aching pain, stiffness or cramp in the leg and thigh. Some degree of pyrexia is usually present and is associated with a

TABLE I.

Analysis of 235 In-patient Records of Lower Limb Thrombosis Occurring at the Royal Adelaide Hospital over a Period of Fifteen Years.¹

Site of Thrombosis.	Without Pulmonary Embolism.	With Pulmonary Embolism.	
		Recoveries.	Deaths.
Saphenous vein	49	6	10
		16	
Femoral vein	128	24	18
		42	

¹There were thus 28 deaths, a mortality rate of approximately 12%, in the series. Cases of pulmonary embolism in which limb thrombosis was recognized numbered 58 (approximately 24%).

slight rise in pulse rate and an elevated white cell count. In any case presenting this clinical picture a careful examination of the limb should be carried out; particular note should be taken of any signs of oedema, dilatation of the superficial venules, colour changes when the limb is dependent, and areas of local tenderness.

The second type presents considerable difficulty in diagnosis. All too frequently, despite careful observation, our attention is drawn to it by the advent of a pulmonary embolism. In the cases in which the patient survives one has often been at a loss to discover the site of the primary thrombus. Aching pain and stiffness in the calf

TABLE II.

Analysis of 245 Cases of Pulmonary Embolism.

Cause of Embolism.	Number of Cases.	Number of Deaths.
Post-operative embolism:		
Gynaecological procedure	29	14
Appendicitis	26	8
Prostate and bladder operations	17	15
Gall-bladder surgery	14	6
Operation for hernia	10	4
Stomach operation	4	3
Other operations	25	14
Embolism due to trauma	16	11
Embolism due to pregnancy	6	1
Medical conditions	98	82
Totals	245	158

and ankle region may be present, but this is by no means always the case. A slightly cyanotic tinge of the foot may be evident when the limb is dependent, and a slight degree of swelling of the affected foot may be present. Homan's sign may be present and should always be sought. It is carried out by forcibly dorsiflexing the foot, and the result is positive if pain is noted in the calf. Careful, gentle palpation of the calf muscles, commencing below, should always be performed. An area of local tenderness is presumptive evidence of deep thrombosis. Low-grade unexplained pyrexia with perhaps slight elevation of the pulse rate may occur and, if present, should direct our attention to the possibility of venous thrombosis in the extremities. Bauer and others recommend phlebography

in such cases, but Fine and Starr, of Boston,¹⁰ who advocated this method in 1942, have with increasing experience found its value much more limited than they had formerly believed.

PULMONARY EMBOLISM.

The embolic phenomena following detachment of a clot are manifested either by the signs and symptoms of a massive pulmonary embolism, when the clot is arrested at the bifurcation or in one or other branch of the pulmonary artery, or by evidence of pulmonary infarction when the clot lodges towards the periphery of the lung. It is not my purpose this evening to discuss the clinical manifestations of pulmonary emboli—the picture of massive pulmonary embolism is known to you all; but I would stress the fact that the advent of pleuritic pain, perhaps associated with a friction rub, and of slight cough with blood-streaked sputum in a case in which convalescence

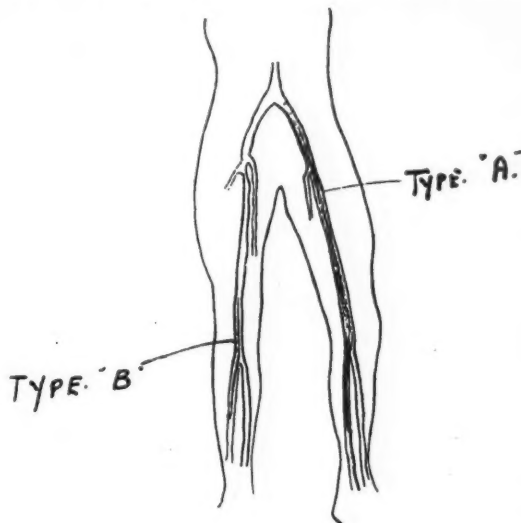


FIGURE II.

is otherwise satisfactory, should always suggest the possibility of embolus of the lung. Too often a diagnosis of pleurisy, bronchopneumonia, or coronary disease is arrived at and no search is made for the source of the clot and no treatment of the peripheral thrombosis is instituted.

THE PREVENTION OF THROMBOSIS AND EMBOLISM.

Preventive methods should embrace measures to combat anaemia, dehydration, abdominal distension and mechanical obstruction of the venous circulation of the legs, all of which are predisposing factors to thrombosis. An example of the latter is that old favourite, the knee-pillow, especially, as so often happens, when it is used in combination with Fowler's position (Figure III). Simpson¹¹ reported on the high incidence of pulmonary embolism during the "blitz" in London, when elderly people were forced to spend long hours reclining in deck chairs in air-raid shelters. In these cases the cross-bar of the seat formed a mechanical obstruction to the venous return.

Tissue trauma and infection are other predisposing factors. It is hardly necessary to remind you that meticulous attention to asepsis, gentle handling of the tissues at operation, and avoidance of mass ligation should always be insisted upon.

Before considering preventive methods in detail, I would remind you again that stagnation of blood in the legs is a predisposing cause of thrombosis. The return of venous blood from the extremity depends on the following three factors: (i) *vis a tergo*, (ii) muscular contraction—a milking process, (iii) the negative intraabdominal pressure that occurs with inspiration.

Vis a Tergo.

Vis a tergo is reduced in any condition that leads to increased circulation time of the blood, as in debilitating illnesses and some cardiac conditions. It has been proved experimentally that the circulation time increases after surgical operations, reaching its maximum about the tenth post-operative day. Oschner and deBakey⁽⁶⁾ in their Shattieck Lecture attribute this circulatory slowing to peripheral vasoconstriction. The administration of thyroid extract and the application of heat to the extremities have been advocated.

Muscular Contraction.

Early and frequent movement of the limbs is most important, and to ensure this the cooperation of the nursing staff is essential. My own experience is that most laparotomy patients, for instance, will not use their limbs unless encouraged to do so.

"Early ambulation", as the Americans call it, has many advocates. Henry Ford, according to that encyclopædia of medical knowledge, *The Reader's Digest*, in an article entitled "They Get Up and Live", is credited with having demanded "bathroom privileges" a few hours after undergoing an abdominal operation. It is needless to add that

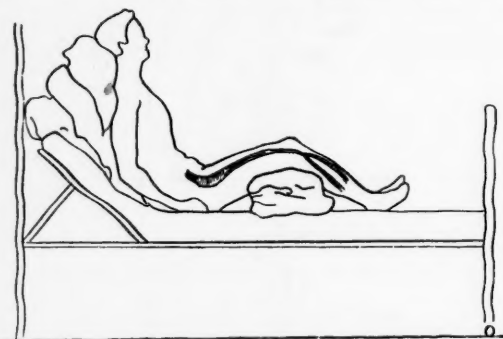


FIGURE III.

After G. de Takats and J. H. Jesser.⁽¹⁴⁾

his request was granted. Fitzgibbon,⁽¹⁰⁾ an ex-Master of the Rotunda, Dublin, in a recent article states that he has never had a death from or even symptoms suggestive of pulmonary embolism. He attributes his success to early "institution of bodily activity", by getting his patients up on the first day after operation. Canavarro,⁽¹¹⁾ while claiming a considerable decrease in the incidence of thromboembolic complications after operation at the Presbyterian Hospital, New York, since early ambulation has been practised, mentions, however, two cases of massive pulmonary embolism occurring in his series.

Negative Intraabdominal Pressure.

Abdominal incisions, gaseous distension of the bowel and tight binders will result in a lessening of negative intra-abdominal pressure by restricting normal diaphragmatic movement. "Carbogen" and breathing exercises, together with early treatment of abdominal distension, are indicated.

TREATMENT OF VENOUS THROMBOSIS.

At the present time two distinct methods of treatment of venous thrombosis are recommended, used either separately or in conjunction. These are the administration of anticoagulants and surgical ligation and division.

Anticoagulation Therapy by Means of Heparin and Dicumarol.

Heparin Treatment.

Murray in 1939, in a Hunterian Lecture delivered to the Royal College of Surgeons in England (quoted by Bauer), reported 50 cases and Bauer⁽¹²⁾ just over 200 cases of

thrombosis treated by heparin with excellent results. The latter observer investigated a series of 264 cases of thrombosis treated by conservative methods and compared the results from the point of view of fatal pulmonary emboli with a series of 209 similar cases treated by heparin. In the first series 47 deaths occurred from pulmonary embolism—a mortality rate of 18%—as against three fatal cases in the heparin series—a mortality rate of only 1.4%. He recommends 24,000 to 70,000 international units of heparin per day given intravenously in intermittent doses. In his cases of massive pulmonary embolism, when time has permitted adequate administration of heparin, there have been no deaths. Bauer emphasizes that the administration of heparin must be combined with early movements on the part of the patient, and states that there are no contraindications to its use. Mild hæmaturia and occasional anaphylactic phenomena were the only complications seen. Heparin has one great advantage over dicumarol in that it acts immediately, which is obviously most desirable; but its cost and limited supply make its use uneconomic at the present time. It is rapidly inactivated by protamine sulphate given intravenously, and a dose of five millilitres of a 1% solution of this preparation is recommended if hæmorrhage occurs.

Dicumarol Therapy.

Link in America in 1941 synthesized dicumarol, and Barker and others from the Mayo Clinic have reported a series of 1,000 post-operation cases treated by dicumarol. In a similar series to that of Bauer they claim to have reduced the mortality rate from pulmonary embolism in cases of thrombosis from 18.3% to 0.6%. However, they mention the following contraindications to the use of dicumarol: (i) impairment of renal function, (ii) hepatic insufficiency, (iii) subacute bacterial endocarditis, (iv) purpura and blood dyscrasias with a tendency to hæmorrhage, (v) operations on the brain and spinal cord.

Dosage.—Barker and his co-workers aim at the production of a prothrombin insufficiency of from 10% to 30% of normal, and insist on daily tests of prothrombin time. The dicumarol is given by mouth in one daily dose, 300 milligrammes being advised on the first day, and the subsequent dosage being governed by the results of prothrombin time tests. They have noted a tendency to hæmorrhage in a small percentage of cases, but believe that this can be controlled by the transfusion of 500 millilitres of fresh citrated blood or by the intravenous administration of 64 milligrammes of menadione bisulphate. Another disadvantage of dicumarol is that it takes from twenty-four to seventy-two hours to act. I have had no experience in the use of this drug; but it would seem that its only advantages over heparin are its low cost and the fact that it can be administered by mouth. Its disadvantages are the necessity for daily estimations of the prothrombin time and its contraindications. With both heparin and dicumarol deaths from pulmonary embolism have been reported, and in some instances at varying periods after the withholding of the drug.

Surgical Treatment by Venous Ligation and Division.

Surgical treatment is by no means new, having been practised in a few isolated instances as far back as 19:1. It has been made popular in recent years by American surgeons. Allen, of Boston,⁽¹³⁾ reports a series of over 800 patients treated by bilateral femoral vein interruption with removal of the clot, when present, by suction. The operations were performed for the following reasons: (i) when signs and symptoms of thrombosis of the leg veins were present (47.3%); (ii) when signs of lung infarction were present (34.4%); (iii) as a prophylactic measure for patients whose age and disability would indicate a high probability of thrombosis during their treatment (18.3%).

The operation, which is performed under local anaesthesia, is for all practical purposes devoid of immediate risk to the patient; but troublesome post-operative oedema has been reported, especially when the interruption of the

femoral vein has been above the junction with its profunda branch. The possibility of propagation of a clot through this branch when the superficial femoral vein (that is, the femoral vein below the profunda junction) is ligated must be remembered; but from available statistics such an occurrence is extremely rare (one case in 800 in Allen's series). Bilateral ligation is advised because the thrombotic process frequently involves both lower limbs.

One indication for bilateral ligation of the femoral veins, with or without removal of the clot by suction, would seem to be when signs of thrombosis are present in the deep set of veins below the knee, with or without complicating pulmonary embolism.

CASE I.—A male patient, aged forty-two years, suffering from chronic cholecystitis and cholelithiasis, underwent a cholecystectomy on July 11, 1946. The post-operative course was uneventful and the patient sat out of bed on July 29. He was of a nervous disposition and did very little to help himself during the following week. On August 5 he developed signs and symptoms of a left-sided pulmonary embolism; but it was not until the following day that signs of venous thrombosis affecting the right calf were evident. An immediate operation was carried out under local anaesthesia, and both superficial femoral veins were divided between ligatures. No further emboli appeared and the patient was discharged from hospital on September 2. When he was examined two months later, practically no oedema of the legs was present.



FIGURE IV.

unilateral "white leg"

The photograph in Figure IV was taken after the patient had been walking about during most of the day.

Ligation of the femoral veins is also indicated in cases in which femoral thrombosis ("white leg") with or without pulmonary embolism appears within the first week. After this period the clot is likely to be firmly adherent and completely fills the lumen of the vein, so that the risk of embolism is remote. If anticoagulants are unavailable, operation would seem reasonable on the unaffected limb in cases of occurring after the first week.

CASE II.—A primipara, aged twenty-two years, was delivered of a normal child on May 11, 1946. On May 18 slight evening pyrexia was present, and the pulse rate varied between 80 and 90 per minute. On May 25 the presence of right-sided "white leg" was noticed and penicillin therapy was instituted. On May 29 "white leg" developed on the opposite side. On June 7 typical right-sided pulmonary embolism occurred, and during the following week she had three further attacks suggestive of multiple pulmonary emboli. Her condition improved until June 23, when at 2 p.m. she suddenly collapsed and a massive pulmonary embolism was diagnosed.

I first examined the patient at 10 o'clock the same evening. Despite routine anti-shock treatment and the continuous administration of oxygen, which had been given before my arrival, her condition was still precarious, and the pulse rate was in the region of 150 per minute. Immediate operation was decided upon, and bilateral femoral thrombectomy and subsequent division of both superficial femoral veins were carried out under local anaesthesia in the patient's bed. After removal of the clot by suction a free retrograde flow of blood occurred from both femoral veins.

An uninterrupted slow convalescence followed, and the patient was discharged from hospital on the eighteenth day after operation.

The question of venous ligation in cases in which pulmonary embolism develops after operation without signs of limb thrombosis is a matter of controversy. My own feeling is that this type of patient should not be operated on as a routine measure, for a small percentage of these

emboli arise from thrombosis of the veins of the pelvic plexus, and if this is the case only caval ligation would be effective. While this procedure is recommended by some authorities, I think it is an operation of some magnitude and must be associated with some mortality. However, a constant watch should be kept for signs and symptoms of thrombosis, and if these appear immediate operation should be carried out.

In cases of superficial (saphenous) thrombophlebitis, in which signs of extension up the thigh appear, ligation of the saphena magna at the fossa ovalis is indicated. Trauma and chemical irritation are frequent aetiological factors in these cases; such lesions frequently occur in patients with varicose veins, and when intravenous therapy has been administered through the leg veins.

In all cases of thrombosis in which an inflammatory element is present the patient should be given penicillin.

Criticism of Femoral Vein Ligation.

There are several points on which the operation of femoral vein ligation is open to criticism. The first is the possibility of further emboli originating in the segment of vein above the point of interruption. This undoubtedly occurs on occasion, but the emboli are generally of a minor nature; in Allen's series there were no cases of fatal emboli following the operation, and minor infarcts occurred in only 5% of cases.

In a small series (10 cases) with which I have been associated there have been two examples of further minor emboli following the operation. Both occurred in cases of thrombophlebitis of the femoral vein ("white leg") and both patients eventually recovered.

The question of residual oedema arises. When considering this question we must remember that the patient with a "white leg" will have residual oedema directly as the result of the thrombophlebotic process, and independently of whether femoral vein interruption is performed or not. In those cases of thromboembolism in which an uninvolved segment of the femoral vein is ligated prophylactically, as is suggested in the treatment of the non-inflammatory type of thrombosis in the lower part of the leg, provided the femoral vein is tied below its profunda branch the oedema will be minimal in amount and, according to Allen, never disabling.

Lymphorrhoea may follow femoral vein ligation, particularly in cases of "white leg"; but it invariably clears up in a short time. A careful technique in isolating the vein by dissecting parallel and as close as possible to it will lessen the incidence of this complication. One example occurred in this series; the patient was an elderly man with "white leg" and the lymphorrhoea cleared up in four days.

Technique of Femoral Vein Ligation.

The operation of bilateral femoral vein interruption with or without suction removal of the clot is best carried out under local anaesthesia. Time will not permit a description of the operation, and the reader is referred to Allen's article⁽¹³⁾ for details of technique.

CONCLUSIONS.

From a review of the available literature it would seem likely that in the not so distant future we shall be able to prevent the immediate complications and sequelae of peripheral venous thrombosis by early anticoagulant therapy used in conjunction with active movement of the body musculature. Until these anticoagulants are available for general use the operation of bilateral femoral vein ligation with or without suction removal of the clot would seem a safe and reliable method of preventing the catastrophic deaths resulting from pulmonary embolism in cases of lower limb thrombosis. The advisability of frequent movements of the legs of patients confined to bed and of early ambulation after operation is stressed.

In a series of ten cases in which the operation of bilateral femoral vein interruption has been performed, no deaths have occurred from pulmonary embolism and no disabling oedema of the leg has followed the operation.

ACKNOWLEDGEMENT.

My thanks are due to Dr. Douglas Coats, my house surgeon, for his valuable help in collecting the case records.

REFERENCES.

- (1) C. Hunter, J. J. Krygier, J. C. Kennedy and V. D. Sneedon: "Aetiology and Prevention of Thrombosis of the Deep Leg Veins", *Surgery*, Volume XVII, February, 1945, page 178.
- (2) A. W. Allen, R. R. Luiton and G. A. Donaldson: "Venous Thrombosis and Pulmonary Embolism: Further Experience with Thrombectomy and Femoral Vein Interruption", *The Journal of the American Medical Association*, Volume CXXVIII, June 9, 1945, page 397.
- (3) J. B. Cleland and D. L. Barlow: "Deaths from Pulmonary Embolism", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume I, 1922, page 175.
- (4) J. S. McCartney: "Post-Operative Pulmonary Embolism", *Surgery*, Volume XVII, February, 1945, page 190.
- (5) G. Bauer: "Thrombosis: Early Diagnosis and Abortive Treatment with Heparin", *The Lancet*, Volume I, 1946, page 447.
- (6) E. R. Trethowie: "The Influence of the Hind Legs and Pelvis on Blood Coagulation", *The Australian and New Zealand Journal of Surgery*, Volume XV, Number 4, 1945-1946, page 292.
- (7) J. Fine and A. Starr: "The Surgical Therapy of Thrombosis of the Deep Veins of the Lower Extremities", *Surgery*, Volume XVII, February, 1945, page 232.
- (8) K. Simpson: "Shelter Deaths from Pulmonary Embolism", *The Lancet*, Volume II, 1940, page 744.
- (9) A. Ochsner and M. deBakey: "Therapeutic Considerations of Thrombophlebitis and Phlebothrombosis", *The New England Journal of Medicine*, Volume CXXV, August 7, 1941, page 207.
- (10) G. Fitzgibbon: "Post-Operative Activity and Resumption of Normal Movement", *British Medical Journal*, September 21, 1946, page 413.
- (11) K. Canavaro: "Early Post-Operative Ambulation", *Annals of Surgery*, Volume CXXIV, August, 1946, page 180.
- (12) G. Bauer: *Loco citato*.
- (13) A. W. Allen, R. R. Luiton and G. A. Donaldson: *Loco citato*.
- (14) G. de Takats and J. H. Jesser: "Pulmonary Embolism", *The Journal of the American Medical Association*, Volume CXIV, 1940, page 14.

POST-OPERATIVE THROMBOSIS AND THE BLOOD COAGULATION TIMES.

By HAROLD CUMMINE,

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THE state of spontaneous intravascular thrombosis may occur not only after operation, but also in patients suffering from diverse medical conditions, especially when associated with states of passive venous congestion or congestive cardiac failure. In these medical cases the superadded element of venous thrombosis is frequently masked completely or partially by the primary disorder. When it occurs in an otherwise normally convalescing surgical patient, however, it stands out as a separate entity. Up until recent years many and varied prophylactic measures have been used with some degree of success by surgeons to prevent the onset of this complication; but they have been unable to eliminate the condition completely.

The treatment of intravascular leg thrombosis has been essentially absolute rest in bed with immobilization of the affected limb and the topical application of such bland non-specific remedies as ichthyol and glycerin. The measures employed against a pulmonary thrombosis, either of embolic origin or of primary spontaneous formation in the pulmonary vessels, have been along general medical lines—the administration of oxygen and of morphine, bed rest, the use of antispasmodics such as papaverine, and recently the administration of penicillin or the sulphonamides to eliminate the element of superadded infection occurring in the devitalized lung tissue. A new note was sounded in the therapy of both leg and pulmonary manifestations by Murray,⁽¹⁾ of Toronto; in 1940 he reported a series of 22 cases of pulmonary embolism of a massive nature treated with heparin, no deaths resulting. As this author observes, the survival rate may be up to

80% in cases such as these, so it would appear that at least 20% of the patients in this series were saved by the specific therapy. The patients in Murray's series were all gravely affected, and no doubt considerably less than 80% would have survived had heparin not been used. He also observed that this drug had a beneficial effect upon the course of intravascular leg thromboses. Other authors have supported Murray's optimistic views upon the value of heparin; but the cost of the drug, and the fact that careful frequent control of the clotting time is necessary, have militated against the wide adoption of this form of therapy.

Heparin, a naturally occurring anticoagulant, was discovered by McLean and Howell in 1916. There is some doubt as to its exact mode of action; but it appears to be an antiprothrombin and an antithrombin. Its action is immediate in prolonging the coagulation time in direct proportion to the amount given. Its mode of excretion is unknown, and it appears to be completely metabolized in the body. It is not absorbed by the alimentary canal, and for this reason has to be administered intravenously, intramuscularly or subcutaneously. These are the routes recommended for clinical use; but in my experience the only reliable route is the intravenous route. In a series of patients heparin was given intramuscularly as a control, and no significant prolongation of the coagulation time was noted. I have had no experience with the subcutaneous use of heparin contained in Pitkin's menstuum. No toxic effects have been observed, and no evidence of a hæmorrhagic state has occurred. These complications have been reported by other observers, but it appears from their reports that they prolong the coagulation time to the order of half an hour. In the cases reported here the objective has been to maintain the coagulation time between ten and fifteen minutes. The dosage of the drug has been regulated by estimation of the coagulation time every four hours. The use of the prothrombin index has not been found of any special value.

Dicumarol, a substance originally prepared from clover, constitutes the latest advance in anticoagulant therapy. This substance apparently has the power to inhibit the formation of prothrombin by the liver, and so to interfere with the normal blood-coagulating mechanism. Its effect is not apparent for at least twenty-four hours, and may persist for a week after suspension of its administration. Up to 200 milligrammes a day may be required, and the dose is regulated by the daily determination of the prothrombin index. In the series of cases upon which this discussion is based, the object aimed at was a prothrombin index of 50%. In only one case did the complication of abnormal bleeding occur. This patient had had a neoplasm removed from the pancreas; and melena, hæmatemesis and hæmorrhage from the wound occurred after the prothrombin index had been reduced to 30%. A blood transfusion ended this abnormal bleeding. The great attraction of dicumarol is that it is administered orally. The limitations of its use in diseases of the alimentary canal or when liver dysfunction is present are apparent. The ideal method of therapy, where possible, appears to be a combination of both these anticoagulant drugs, heparin being used in the initial stage until the effect of dicumarol appears.

Prophylaxis in States of Intravascular Thrombosis.

The attention of surgeons and clinicians has long been directed to the detection of early signs and symptoms which may indicate the onset of thrombosis. It is well established that in a considerable percentage of cases there is a preliminary rise in the pulse rate and the temperature. The patient may complain of such localized symptoms as cramps or pain in the muscles of the leg, especially the calf. He may have a feeling of general malaise, vague retrosternal oppression or mild attacks of chest pain, dyspnoea or cyanosis, indicating a minor pulmonary embolism. The post-operative occurrence of pleurisy for which no specific operative trauma can be blamed is a significant warning. However, in spite of all this, there still appears the major pulmonary embolism which comes unheralded and is frequently fatal. Various surgical clinics have reported that early post-operative ambulation, or

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on

when this is impossible, the institution of a strict regimen of bed exercises and deep breathing, has considerably reduced the incidence of these complications, but few indeed have been able to eliminate the condition completely. Bergquist,⁽²⁾ of Copenhagen, in 1940 published his work on the use of the post-operative coagulation graph. He found that in those cases in which states of intravascular thrombosis subsequently developed, the coagulation time came down and remained at three minutes for a period of hours before the onset of clinical signs or symptoms. He further showed that the intravenous use of heparin at this stage prevented the onset of the condition. Using a different technique for estimating the coagulation time, at the Department of Urology of the Royal Prince Alfred Hospital, Sydney, this method of Bergquist has been applied for eighteen months, and his contentions have been found to be accurate. Bergquist estimated the coagulation time by withdrawing blood from a vein and observing its clotting time upon a clean glass slide. In this hospital series the usual method of estimating the coagulation time by use of a capillary tube after procuring the blood from a finger-prick has been used. The tube is broken off in small segments at intervals of a minute until a definite thread of clotted blood is apparent. It is regarded as of importance that the finger shall be dry, and particularly that it shall be free from spirit, which has the power of coagulating blood protein and accelerating the apparent coagulation time. Any degree of moisture on the finger has a diluting effect and prolongs the time. It can be stated that no case of infection of the finger has occurred. The pulp space is not used, but the edge of the finger just to the side of the nail. The index finger and thumb are never used.

The Normal Graph.

The blood coagulation time of any person, irrespective of the temperature of the day, is not a static thing, but varies from hour to hour and from day to day, so that when the graph is plotted it resembles the undulating curve of simple harmonic motion. (See Figures I, II and III.)

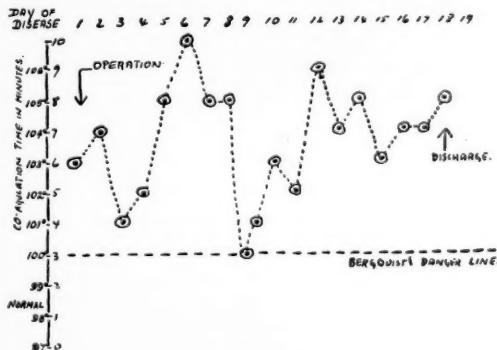


FIGURE I.

Normal coagulation time graph. The normal phasic variation is clearly shown, and although in two instances a reading of as low as three minutes was obtained no fixation was evident.

An isolated reading of three minutes or less frequently occurs and is of no significance. What does matter is the fixing of the reading at this low level. In the event of a reading of under four minutes being obtained, the test is repeated at intervals of one hour, and invariably a phasic rise and fall will be revealed if no thrombotic state is developing. In this latter event, the coagulation time remains fixed. Without exception, all the patients in our series who had or subsequently developed thrombophlebitis or a pulmonary embolism exhibited this phenomenon. In no instance did we find it occurring in cases in which these complications did not develop. In view of these findings, the practice of reporting a patient's coagulation time as compared to a "normal" control seems unnecessary and provides no special information.

Technique of Administration of Heparin.

It was aimed to keep the coagulation time within the range of ten to twenty minutes and as near to fifteen as possible. It is probable that a level higher than ten minutes is not required. Two techniques were used; either the heparin was given intermittently at intervals of four hours, or a continuous intravenous drip apparatus for the administration of saline solution was set up and the heparin was introduced through the rubber tubing when required. The coagulation time was determined every

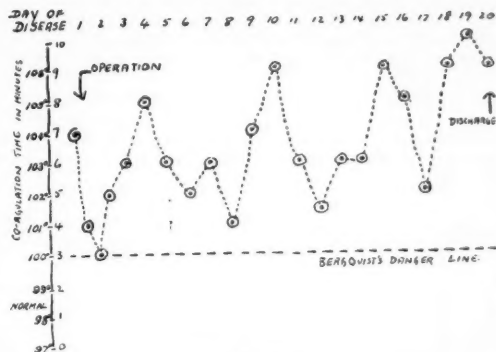


FIGURE II.

Normal coagulation time graph. The normal phasic variation is clearly shown, and although in two instances a reading of as low as three minutes was obtained no fixation was evident.

four hours, and if the reading approached ten minutes the test was repeated at intervals of one hour and further heparin was given if the figure fell below this level. It was found that the latter method was more acceptable to the patient and the resident medical staff and provided a more accurate regulation for administration of the heparin. The available subcutaneous veins are soon exhausted when the intermittent method alone is used. The main danger of giving fluids intravenously for twenty-four hours in

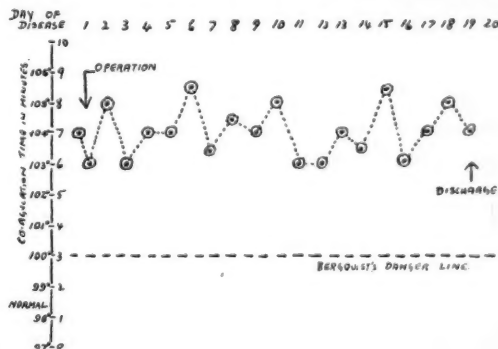


FIGURE III.

Normal coagulation time graph. The normal phasic variation is clearly shown, and although in two instances a reading of as low as three minutes was obtained no fixation was evident.

these cases would appear to be overloading of the circulatory system or the production of pulmonary edema in the presence of failure of the right side of the heart. However, this objection was not valid in the cases presented, as the rate of flow was so regulated that the vein was merely kept patent. Normal saline solution and distilled water were used, glucose solutions being avoided, as their slow rate of administration might be conducive to local thrombosis. It was not found necessary to maintain the continuous administration of fluids longer than twenty-

four hours, and intermittent administration of heparin by venepuncture was then adopted for the following few days, the longest period found necessary in any one case. The indication for intravenous administration of heparin was regulated solely by the level on the graph of the coagulation time, which was kept above ten minutes. When constitutional symptoms—raised temperature and pulse rate—had disappeared, the coagulation times were no longer interfered with and were found to follow the normal variation curve.

In one case, after subsidence of two pulmonary embolisms, a period of normal graph readings of some days' duration occurred, and then suddenly a low fixed level reappeared and peripheral thrombophlebitis became apparent. A small amount of heparin given for two days reestablished the coagulation time graph at a normal level.

No evidence of toxæmia or idiosyncrasy due to the heparin occurred in the cases under discussion, nor did the prolonged intravenous medication give rise to any infection, local or general. For an example of heparin administration see Figure IV.

mendations in the literature a prothrombin index of 30% was achieved in the first three cases. In the third case, melena, hæmatemesis and wound hæmorrhage developed, which could not reasonably be attributed to other factors than the dicumarol, so in subsequent cases an index of 50% was the objective. At first daily prothrombin index readings were made, but as there appeared to be a steady fall in the prothrombin index proportional to the amount of dicumarol given, the determination of the prothrombin index has been extended to every second day, and this appears satisfactory. Nausea and vomiting have not been observed with the administration of this drug. The coagulation graph does not vary proportionately with the quantity of dicumarol given as is the case with heparin. Readings as high as twelve minutes and as low as two minutes have been observed when the prothrombin index is in the 30% to 40% range.

The Electrocardiogram.

In most cases serial electrocardiographic tracings were made, as it was found that a single tracing was of diag-

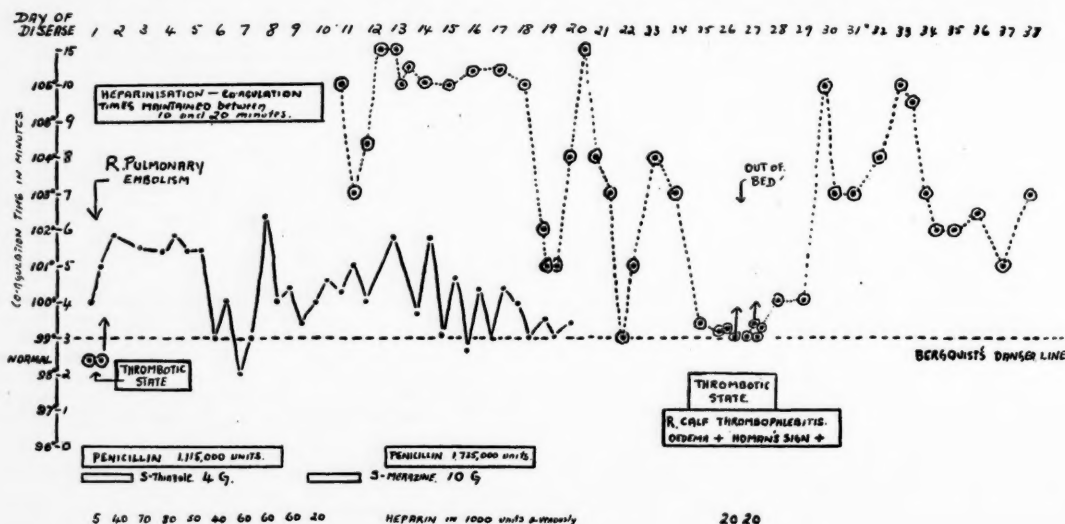


FIGURE IV.

Coagulation time graph of a patient who suffered a left pulmonary embolism immediately after the removal of a gangrenous appendix, from which he progressed uneventfully until the nineteenth day after the operation. Then he suffered another massive right pulmonary embolism. The graph commences at this stage. Persistent readings of less than three minutes for several hours were obtained, which confirmed the existing thrombotic state. He was given heparin for ten days and thereafter progressed satisfactorily until the twenty-fifth day from the onset of the right pulmonary embolism, when the coagulation time graph showed evidence of a thrombotic state again. Thrombophlebitis developed in the calf of the right leg. The administration of 40,000 units of heparin and getting the patient up served to reestablish a normal state of blood coagulability, and the leg lesion rapidly resolved.

Adjuvant Therapy.

Once heparin treatment was commenced, active movements of all but the limb by which the saline solution was being administered intravenously were carried out, and bed movements and deep breathing exercises were instituted. The patient was made ambulant at the earliest possible moment compatible with general surgical and medical principles. Massage was forbidden in view of the suggestions of Allen, Ochsner and Homans that thrombus formation is frequently present in the veins of the legs without giving rise to appreciable local clinical signs. Penicillin was given continuously throughout the period of treatment with heparin as a safeguard against faults in the aseptic technique of multiple venepuncture and in an effort to prevent the element of superadded infection in the devitalized lung tissue.

Dicumarol Therapy.

Dicumarol was used in conjunction with heparin (see Figure V) in some cases, and in view of the recom-

nostic value in only a small percentage of cases. This finding is in conformity with the opinion of other observers. The accepted abnormal findings most commonly seen in pulmonary embolism are a deepening of the S waves in Leads I and II and of the Q wave in Lead III, a depression of the S-T segment in Leads I and II, and an inversion of the T wave, which later returns to normal, especially in Lead III. An accentuation of right axis deviation, particularly if transient, is of value. In one case in which four major pulmonary embolisms occurred and the patient survived, the electrocardiogram revealed persistent left axis deviation. The most that can be said of this diagnostic aid is that it lends valuable confirmatory evidence, but may be completely undiagnostic.

Chest Skiagrams.

The presence of a pulmonary embolism may be immediately apparent in skiagrams with the finding of an area of infarction, although in some instances radiological signs do not appear for several days. It must be

remembered that embolism is not synonymous with infarction, as the subsidiary bronchial arterial supply to the lung parenchyma may be adequate to prevent infarction. Furthermore, partial infarctions, which appear as triangular areas of vague opacity and subsequently disappear, may indicate a mid-point between embolism with infarction and embolism without demonstrable infarction. The radiological picture may be that of frank consolidation or pleurisy with effusion. This effusion is rarely extensive. Dilatation of the pulmonary cone may be present, and the right side of the heart may be enlarged. A comparative increase in the hilar shadows which subsequently disappears is regarded as a valuable sign. It has been observed by means of serial films that frequently an area of linear fibrosis may occur, which increases in intensity and then slowly fades. True abscess formation in rare instances appears in an infarcted area. The radiological differential diagnosis between lower lobe infarction and pneumonic consolidation, especially in the presence of

thrombotic states. This work has been done in cooperation with Lyons and will be the subject of a further publication.

Conclusions.

1. The occurrence of a thrombotic state as described by Bergquist has been confirmed.
2. This may be detected by the use of daily post-operative determination of the blood coagulation time expressed graphically.
3. The use of heparin as a prophylactic measure against pulmonary thrombosis in cases in which this thrombotic state is present, as advocated by Bergquist, appears of value.
4. None of the sixteen patients with pulmonary embolism died who were treated by heparin alone or in combination with dicumarol.
5. Serial electrocardiogram and chest skiagrams may be of diagnostic value.

Acknowledgements.

I take this opportunity of expressing my appreciation of the assistance and cooperation of the members of the medical and surgical staff of the Royal Prince Alfred Hospital, who have made available the patients for this investigation, and the resident and nursing staffs for their enthusiastic help.

Reference.

- (1) G. D. W. Murray: "Heparin in Thrombosis and Embolism", *The British Journal of Surgery*, Volume XXVI, January, 1940, page 567.
- (2) S. Bergquist: "Über postoperative Thrombosen", *Acta chirurgica Scandinavica*, Volume LXXXIII, 1940, page 415; abstracted in *The Australian and New Zealand Journal of Surgery*, Volume XII, October, 1942, page 155.
- (3) R. N. Lyons: "Thiol-Vitamin K Mechanism in Clotting of Fibrinogen", *The Australian Journal of Experimental Biology and Medical Science*, Volume XXIII, June, 1945, page 131.

Reports of Cases.

ANAPHYLACTIC PURPURA FOLLOWING INTRAMUSCULAR PENICILLIN THERAPY.

By A. B. ANDERSON,

Medical Superintendent, Repatriation General Hospital, Hobart.

CASES of anaphylactic reaction during or following penicillin therapy have been reported. I have seen one patient with swelling of the face followed by rash occurring during the treatment of ocular infection by instillation of penicillin drops into the eyes. Cases have been recorded of urticaria and even of swelling of joints as a reaction to penicillin given intramuscularly; but no case similar to that described below has, to my knowledge, been previously recorded.

Clinical Record.

The patient was a male, aged thirty-seven years. He was an intelligent type of man, and had a previous history of an anxiety reaction state whilst on war service. Investigation of the family history revealed no evidence of purpura. A sister of his father suffered from asthma, but the patient himself had had no previous symptoms similar to the condition described below. There was no delay in blood clotting time. He was admitted to hospital on July 1, 1946, for operation, on account of an osteoclastoma at the lower end of the right femur. The Kline test failed to produce a reaction.

At operation, the expanded lateral condyle was opened and an area of softened bone was found, walled off by a denser shell. The exact pathological condition was doubtful. The softened bone was removed and the area was packed with bone chips from the iliac crest. A pathological report on the diseased bone was to the effect that there was no evidence of neoplasm; there appeared to be some necrosis of the intertrabecular tissue, but no fibrosis

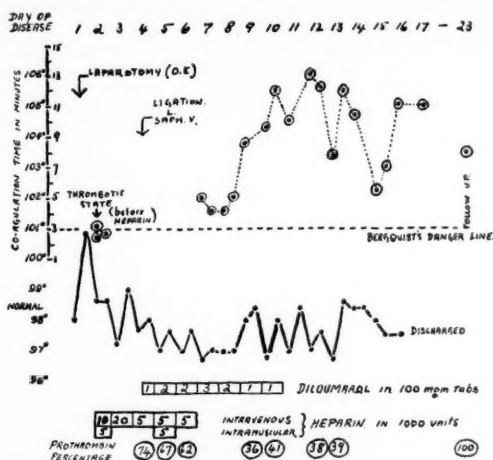


FIGURE V.

Coagulation time graph of an adult male upon whom laparotomy was performed under ether anaesthesia ("open" method) for acute epigastric pain. No intra-abdominal lesion was detected. Pronounced thrombophlebitis of the calf and greater saphenous vein was present in the left leg. Persistent readings in the order of three minutes indicated the presence of a thrombotic state. The administration of heparin and dicumarol is indicated on the graph, together with the control prothrombin percentage, as compared with normal.

congestive cardiac failure, may be impossible. Infarcts in the upper lobes of the lung are rare. It may be said that a skiagram may be completely diagnostic of pulmonary thrombosis or may offer little help.

The Leucocyte Count.

When pulmonary embolism occurs in the absence of preexisting pulmonary abnormality of an inflammatory nature, the leucocyte count rarely rises above 10,000 per cubic millimetre and a neutrophile leucocytosis is not a feature. When superadded infection occurs, this state of affairs may change. The blood platelet count in this series did not vary significantly.

Fibrinogen in Thrombosis.

A further stage in this investigation has been the attempt to detect an abnormality in the blood-coagulating mechanism which may explain the increased coagulability shown in the graphs. Following the work of Lyons,⁽³⁾ who demonstrated and isolated an intermediate form of fibrinogen characterized by its free sulphhydryl groups in the normal clotting mechanism and further showed the existence of this substance in the plasma of patients suffering from acute and chronic infection, investigations were carried out to study the role of this fibrinogen in

or inflammatory infiltration. The serum calcium level was 14 milligrammes *per centum*.

Progress was satisfactory until seventeen days after operation, when the patient's temperature rose to 100° F. He was given sulphadiazine, two grammes *statim* and one gramme every four hours. Two days later redness was present round the incision, and the appearance suggested an impending discharge. Later on the same day the wound discharged creamy pus, slightly blood-stained. Sulphadiazine treatment was discontinued, and he was given a course of penicillin, 15,000 units every three hours, a total of 500,000 units being given. The wound healed and he was discharged from hospital after seven days.

The patient remained at home for six and a half weeks. During this time the sinus reopened and closed several times, until he slipped and fell. This occasioned acute synovitis of the right knee joint and led to his readmission to hospital; the wound sinus was discharging at this time. Culture of material from the sinus produced a growth of *Staphylococcus aureus* and a few diphtheroid bacilli. The patient was given a further course of penicillin, 15,000 units every three hours. On this occasion he received 945,000 units over a period of nine days, and the sinus had ceased discharging by the time this course was finished.

Two days later, on October 1, the patient complained of upper abdominal pain, and tenderness was present on pressure across the upper part of the abdomen, which was soft and moved normally on respiration. The stools at this time were normal. He vomited a small quantity of yellow fluid that evening. On October 2, he felt better and did not vomit. On October 3, he again complained of abdominal pain and nausea, but did not vomit. The sinus was now closed. During the evening he was observed to have a number of raised painful areas on the arms; the areas were not itchy, nor was the skin colour altered. These areas subsided in approximately four hours. No vomiting occurred.

On October 4, he had abdominal pain, and both hands were swollen, particularly the metacarpo-phalangeal joints. Some heat was present, but no redness. He was given ephedrine, 0.5 grain three times a day. During the evening he had severe abdominal pain and diarrhoea, and passed a little blood in the stools.

On October 5, abdominal pain was severe, and the patient passed frequent stools containing red blood. No vomiting occurred. During the night he passed a brown liquid stool flecked with blood.

On October 6, similar conditions continued, and he vomited twice during the evening. During the night his hands again became swollen and he passed a further blood-stained stool.

On October 7, his hands were swollen (particularly the left), and much bright red blood was present in the stools; red blood was also seen in the vomitus. He again had transient swellings in the arms and complained of pain in the shoulders. The abdomen was uniformly dull to percussion, but no distension was observed. The blood platelet count was 300,000 per cubic millimetre. He was given adrenaline, five minims every four hours, and "Penta-Kaps", two to three times a day, and glucose was "pushed" by mouth.

On October 8, a small amount of barium was given by mouth, and in four hours this was seen to have reached almost to the hepatic flexure.

On October 9, he passed a soft brown stool free from blood, and his general condition was improving. The urine contained a large amount of albumin.

On October 10, his condition had further improved, and the administration of adrenaline was discontinued. From this stage he continued to improve, the abdominal pain ceased and no further vomiting occurred. The stool was semi-formed and free from blood. On October 10, the urine was found to contain a large amount of albumin, and on October 15, a microscopic examination revealed that the urine contained numerous casts (granular and

epithelial), numerous kidney epithelial cells, a few red blood cells, a moderate number of lymphocytes and no organisms. On October 22, the blood urea level was 26 milligrammes *per centum*. On October 23, a further microscopic examination of the urine revealed similar findings; but red blood cells were numerous, and on October 26, they were very numerous. Throughout the illness no organisms have been present in the urine, and from October 10, the quantity of albumin in the urine decreased until October 25, since when it has remained stationary. No abnormal signs have been found in the retinae, and no generalized edema has been noted. On October 25, the systolic blood pressure was 112 millimetres of mercury and the diastolic pressure 70.

Comment.

This patient showed the joint symptoms described by Schönlein and the intestinal crises described by Henoch. An associated toxic nephritis has been present which so far is persistent.

Summary.

An account is given of a case of anaphylaxis, apparently resulting from penicillin therapy, the manifestations being (i) transient swelling of joints and subcutaneous tissues, (ii) intestinal purpura and (iii) toxic nephritis.

Acknowledgement.

I wish to express my thanks to the Chairman of the Repatriation Commission for permission to publish this report.

MENINGITIS: ISOLATION OF AN ORGANISM RESEMBLING NEISSERIA CATARRHALIS FROM CEREBRO-SPINAL FLUID; REPORT OF A CASE.

By W. J. NEWING and R. CHRISTIE,
Saint Vincent's Hospital, Melbourne.

ALTHOUGH in the majority of cases of purulent meningitis the organism found is *Neisseria meningitidis*, *Mycobacterium tuberculosis*, *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Haemophilus influenzae* or *Staphylococcus pyogenes*, about fifty different organisms have at various times been found. In a series of 3,178 cases reported by J. B. Neal in 1935 *Neisseria catarrhalis* was responsible on two occasions. In the case now being reported the organism found was a *Neisseria* resembling *Neisseria catarrhalis* morphologically and biochemically, but possessing a well-marked capsule.

Clinical Record.

The patient, Mrs. M.M., aged forty-five years, was admitted to hospital at 5 p.m. on June 23, 1946. The following history was obtained from her relatives. Six days previously she caught a heavy cold and went to bed. She had a severe cough but little sputum. This "cold" had not improved. On June 22 she was drowsy all day and continually fell asleep. She vomited frequently during the day. On the morning of June 23 she showed no signs of recognizing her relatives, was semi-comatose and became violent if interfered with.

Examination showed the patient to be a heavily built woman, semi-comatose. She screamed and struggled when moved and lay on her side with her head flexed. Her temperature was not recorded because of her resistance. Her pulse rate was 100 per minute and the respirations numbered 40 per minute; they were shallow. Some crepitations were heard at the base of the left lung. Tests for neck stiffness could not be made. The rest of the physical examination revealed no abnormality.

At 6.20 p.m. on June 23 a lumbar puncture was performed and yellow, cloudy cerebro-spinal fluid was obtained at a pressure of 200 millimetres. "Sodium Gardenal",

three grains, was given and 15,000 units of penicillin were administered intramuscularly every three hours. At 8.45 p.m. lumbar puncture was repeated and 10,000 units of penicillin were introduced into the theca. The respirations at this time numbered 62 per minute. The intravenous injection of saline solution was commenced. Death occurred at 12.45 a.m. on June 24, seven hours after the patient's admission to hospital.

Post-Mortem Findings.

Post-mortem examination revealed the following findings. The meninges were congested. The subarachnoid space was filled with purulent fluid. The pontine cistern contained frank pus. Dense adhesions were present in the subarachnoid space in the region of the optic chiasm and the circle of Willis. The foramina of Magendie and Luschka were patent. The ventricles were not dilated. The choroid plexus was somewhat congested. The brain substance was soft, but showed no gross macroscopic change. Examination of microscopic sections revealed a considerable amount of nuclear degeneration. The ethmoid, sphenoid, frontal and mastoid sinuses and the middle ear were normal in appearance. Both lungs were congested, and patchy areas of bronchopneumonia were present on the lower lobe of the left lung; they were of recent origin. The spleen weighed eight ounces and was soft and congested. No gross macroscopic abnormalities were detected in the other organs.

Bacteriological Investigation.

Both samples of cerebro-spinal fluid, examined immediately after collection, contained numerous polymorphonuclear leucocytes and diplococci. The latter were so numerous that several were visible in each oil immersion field of a stained specimen prepared without centrifugation. They were intermediate in their reaction to the Gram stain. Mice inoculated intraperitoneally with one-millilitre samples of the fluid were unaffected.

The organism, although first isolated on blood agar in an atmosphere with increased carbon dioxide pressure, grew well on nutrient agar and gave as heavy a growth at 22° C. as at 37° C. When first isolated it was still intermediate in its reaction to the Gram stain, but it became "negative" after several subcultures. Colonies on blood sugar were fairly large, of a mucoid consistency and non-pigmented; they failed to react to the oxidase test. Stable suspensions were formed in saline solution. Lactose, dextrose, saccharose and maltose were not fermented. Well-formed capsules were easily demonstrated. Growth in nutrient broth produced uniform turbidity; involution forms were found in cultures after twenty-four hours' incubation. Very little growth occurred under anaerobic conditions.

The organism was only slightly pathogenic to mice and guinea-pigs when inoculated intraperitoneally. Doses of 4,000,000,000 organisms and over were required to cause death in mice, while in the case of guinea-pigs 16,000,000,000 organisms and over were required. Post-mortem examination of the guinea-pigs revealed no changes except considerable vascular congestion of the peritoneum; the organism was recovered from the peritoneal fluid but not from heart blood, spleen or kidneys.

The organism was relatively resistant to penicillin *in vitro*. On blood agar containing varying quantities of penicillin it grew well when the unitage was as high as one per millilitre, but was inhibited by two units per millilitre. Its resistance to penicillin in nutrient broth was of the same order. A freshly isolated culture of *Neisseria meningitidis*, tested at the same time on blood agar, was inhibited by one-tenth of a unit of penicillin per millilitre, while a standard staphylococcus strain (F.D.A. 209) was inhibited by one-twentieth of a unit per millilitre.

When tested for sulphonamide sensitivity by Harper and Cawston's (1945) method, the organism was found to be sensitive to sulphanilamide, sulphadiazine, sulphathiazole and sulphapyridine. It was not agglutinated by anti-meningococcus antisera of groups I, II and IV.

Comment.

These results indicate that the organism except for its capsule resembles *Neisseria catarrhalis* more closely than any of the commoner members of the genus *Neisseria*. It was considered advisable to report these findings in view of the fact that the organism is not commonly found in cerebro-spinal fluid and also in view of its reactions to penicillin and the sulphonamides.

Summary.

A case of purulent meningitis is reported, in which an organism resembling *Neisseria catarrhalis* was isolated. This organism was relatively resistant to penicillin but sensitive to sulphonamides.

Bibliography.

Josephine B. Neal: "Diagnosis and Treatment of Meningitis", *The Medical Clinics of North America*, Volume XIX, 1935, page 751.

G. J. Harper and W. C. Cawston: "The In-Vitro Determination of the Sulphonamide Sensitivity of Bacteria", *The Journal of Pathology and Bacteriology*, Volume LVII, 1945, page 59.

Reviews.

TUBERCULOSIS IN THE WEST INDIES.

"TUBERCULOSIS IN THE WEST INDIES" is the report of a survey conducted in the British colonies in the West Indies by Dr. W. Santon Gilmour.¹ The survey was made at the request of the governments concerned and was aided by a grant made by the National Association for the Prevention of Tuberculosis, which also has published this report. Dr. Gilmour worked in the colonies during 1943 and 1944 and viewed the problem from all aspects. He found that the disease is far more difficult to treat in the native population because of ancient superstitions as well as from lack of proper facilities. There is a wealth of implication in his brief statement: "The meaning of proper rest for tuberculosis is not yet understood in the West Indies." In Trinidad Dr. Gilmour induced a number of artificial pneumothoraces, but he regretfully states that there are no thoracoscopic instruments available in the colony for the division of pleural adhesions. A series of illustrations of native houses shows that they are of a very primitive type and rarely emerge from the "shanty" classification, and the author strongly stresses the necessity for a general improvement in living conditions before there can be a decrease in the incidence of the disease. The death rate from the disease averages about 100 per 100,000 in the colonies as a whole and is highest in the Bahamas, where it is 255.5 per 100,000, this latter figure being about four times that found in the British Isles. Specific recommendations are made for treatment of the disease in each separate colony and all are very sage and practical. However, whether they will be acted upon is another matter, for even in our own country the authorities are more than slothful in putting into action the recommendations of an expert committee appointed to investigate the disease. It is poor consolation to know that Australia is not the only country in the Empire that is behind the times in eradicating this preventable scourge.

ACIDOSIS.

IN a recent volume by Esben Kirk entitled "Acidosis: Clinical Aspects and Treatment with Isotonic Sodium Bicarbonate Solution", a strong plea is put forward for the use of sodium bicarbonate in the treatment of acidosis of diverse origins.²

The author divides the clinical forms of acidosis into: (a) physiological acidosis; (b) acidosis due to uncomplicated loss of alkali; (c) acidosis caused by loss of alkali, complicated by infection and intoxication; (d) acidosis due to

¹"Tuberculosis in the West Indies: Report on Sociological and Clinical Survey", by W. Santon Gilmour, M.B.; 1946. London: The National Association for the Prevention of Tuberculosis. 8½" x 5½", pp. 222, with illustrations.

²"Acidosis: Clinical Aspects and Treatment with Isotonic Sodium Bicarbonate Solution", by Esben Kirk, M.D.; 1946. Copenhagen: Einar Munksgaard, Norregade 6; London: William Heinemann (Medical Books), Limited. 9½" x 6", pp. 226. Price: 18 Kroner.

persistent antacid vomiting; (e) acidosis caused by an abnormal production of acid; (f) acidosis as a consequence of an inhibition of the tissue oxidation; (g) acidosis due to retention of acid; (h) acidosis due to an abnormal intake of acid; (i) acidosis in various other intoxications; (j) other forms of acidosis not yet elucidated; (k) premortal acidosis; (l) chronic acidosis.

He discusses each of these from a clinical standpoint. The outstanding contribution in the book is the section on treatment. The author advises the use of an isotonic solution (1.3%) of sodium bicarbonate. This may be administered intravenously, intrasternally, subcutaneously or rectally. Details are given of the preparation of sterile solutions suitable for subcutaneous use. The quantities of bicarbonate to be administered in each case in order to relieve acidosis can be calculated approximately by means of a nomogram constructed by Van Slyke. Many case records are given in the text, with apparent successful treatment of profound acidosis by the intravenous use of isotonic sodium bicarbonate solution. Other measures, for example, the use of insulin in diabetic coma, were not neglected. The use of alkali in any considerable quantity has not found much favour in recent years, particularly in the treatment of the acidosis of diabetic coma. Perhaps the use of alkali has been unduly neglected. To Esben Kirk we owe our thanks in directing our attention to a valuable form of therapy if intelligently used.

RHEOCARDIOGRAPHY.

RHEOCARDIOGRAPHY ("RKG") is the name given by W. Holzer, K. Polzer and A. Marko, of Vienna, to a method which they have devised of recording graphically the fluctuations in the electrical resistance of the heart during its systole and diastole.¹ The authors claim that such records make it possible for the first time to measure simply and directly the first and second phases of ventricular systole. These measurements they state to be of value in the early recognition of weakening of either ventricle, as an aid to the diagnosis of various other morbid states of the heart, and in experimental pharmacology. They make some interesting remarks on the origin of the second heart sound. The translation is very weak: many apparently important passages of the work are unintelligible and the whole text is a curious word salad, quite difficult for the English-speaking reader to follow. We would advise the reader who may be interested to try to obtain the work in the original German.

WAR SURGERY.

THE fact that Trueta's important book on war surgery has now reached a third edition is good proof of its essential worth.² And in truth this handsome volume has many attractive features. Its purpose is to illustrate methods of treatment (of injury) which aim at collaboration with the natural mechanisms of defence and are therefore called biological methods of treatment.

After a survey of the history of war surgery, in which it is stressed especially that the biological principles of Hippocrates became replaced by the false doctrines of Galen and his followers (with their faith in the healing effects of external applications, rather than in assisting Nature), Trueta proceeds to show how such natural assistance can be secured in wound surgery. This requires prompt surgical treatment, cleansing of the wound, excision of the wound, provision of drainage and immobilization in a plaster of Paris cast.

The techniques which Trueta and his colleagues in the Spanish Republican Army first applied to large numbers of wounded soldiers are then discussed in detail, together with modifications arising out of the experience of the recent war. This experience is carried to the cessation of hostilities in Europe, and includes the study of large numbers

of battle casualties in the Wingfield-Morris Orthopaedic Hospital at Oxford.

The technique of plaster of Paris immobilization, which has always been an important feature of the biological treatment, is discussed fully, both in relation to its physiological advantages and also to its application to various regions of the body.

When one reflects on the beautiful technical production of this book, and on the flawless English of its narrative, it becomes easy to sense the pride of its exiled Spanish author, that by the spread of these beneficent doctrines he is ensuring that "the citizens of Barcelona and the armies of Catalonia which fought in the Spanish Republican Army did not, in the ordeal they underwent over eight years ago, suffer in vain". No young surgeon can proceed far with his surgical education without a study of the biological treatment of wounds, and this work should for long serve as the standard textbook in that field.

ELECTROTHERAPY FOR MASSAGE STUDENTS.

THE third edition of "Medical Electricity for Massage Students", by Hugh Morris, provides all massage students with a full and up-to-date account of all the different phases of electrotherapy.¹ Throughout the book the various topics are dealt with in a clear and dogmatic manner, and these factors make the book readable both from a student's and also from a teacher's point of view. Complete descriptions of the different electrical appliances are given and definite instructions issued as to their proper use. The chapter devoted to muscle and nerve testing is especially well written, as is the chapter on medical diathermy in which the scope and limitations and dangers of this form of treatment are fully enumerated. While it is not the task of the masseur to select the form of electrical or other therapy that is best suited for any disease, from an examination viewpoint all students must know the range of the instruments that they may be called upon to use, and so a very useful list of the treatment most beneficial for different diseases is given. Finally in the book is appended a glossary which all students will find helpful.

WOMEN IN INDUSTRY.

"WOMEN IN INDUSTRY", by Anna M. Baetjer, presents a complete picture of this complex problem.² The author provides much useful advice about all phases of the employment of women and discusses the most suitable types of work and also the relation of the women's physique to the type of work to be done. Sick absenteeism among women and all its various causes are well covered. Throughout the book both British and American statistics are quoted, many being in tabular form which facilitates their interpretation. Many comparisons with figures for males are given also, and it is noticeable that women are absent from work much more frequently than men. However, besides occupational and accidental causes for this the main factors are those associated with the reproductive system, whether they are gynaecological or obstetrical in origin. One series of figures is of interest, as they show that far more periods of sickness absenteeism commence on Mondays than on any other day of the week, but they also show that far more workers resume work after illness on Mondays than on any other day, so the problem of "Mondayitis" is rather confusing. After a careful analysis of the figures it is concluded that nothing definite can be said about the effect of industrial occupations on mortality among women; but with careful selection of suitable jobs there is little likelihood that the mortality of women will be increased by their occupation. A complete appendix is given of occupations suitable for women which also indicates the normal training period required for each position. This is a book which will be of great value to all industrial health officers and also to factory and business executive officers, as it gives much advice calculated to improve the health of all women in industrial occupations.

¹"RKG Rheocardiography: A Method of Circulation's Investigation and Diagnosis in Circular Motion", by W. Holzer, K. Polzer and A. Marko; authorized English translation by Mrs. Emma M. Kreidl, Vienna; 1946. Vienna: Wilhelm Maudrich. 9½" x 6", pp. 52, with 44 illustrations.

²"The Principles and Practice of War Surgery, with Special Reference to the Biological Method of Treatment of Wounds and Fractures", by J. Trueta, M.D., Hon.D.Sc. (Oxon.); Third Edition; 1946. London: Hamish Hamilton Medical Books, in conjunction with William Heinemann (Medical Books) Limited. 9½" x 6", pp. 444, with many illustrations. Price: 42s.

¹"Medical Electricity for Massage Students", by Hugh Morris, M.D., D.M.R.E.; Third Edition; 1946. London: J. and A. Churchill Limited. 8½" x 5½", pp. 356, with illustrations. Price: 21s.

²"Women in Industry: Their Health and Efficiency", by Anna M. Baetjer, Sc.D.; issued under the auspices of the Division of Medical Sciences and the Division of Engineering and Industrial Research of the National Research Council; 1946. Philadelphia and London: W. B. Saunders Company; Melbourne: W. Ramsay (Surgical) Proprietary Limited. 9½" x 6", pp. 346. Price: 30s.

The Medical Journal of Australia

SATURDAY, MARCH 8, 1947.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE RECENT EMPIRE SCIENCE CONFERENCES AND THEIR SIGNIFICANCE.

THE Empire Scientific Conferences of 1946 attended by a group of eleven delegates from Australia really comprised two conferences. The first was the Royal Society Empire Scientific Conference which met at Oxford and Cambridge from June 17 to July 8, 1946; the second was the British Commonwealth Scientific Official Conference which was held in London from July 9 to 19, 1946. These two conferences were followed in the next week by a third—the Imperial Agricultural Bureaux Review Conference. The report of the proceedings of the Official Conference has been printed¹ and gives a general account of what happened at the first two conferences. The report is a formal and somewhat uninspiring summary of recommendations and resolutions. Sets of papers presented, the minutes of the plenary sessions and the reports of the several committees which did the main work of the Official Conference have been supplied to each of the governments represented. The resolutions of the Royal Society conferences are set out in an appendix. When this document is read in conjunction with the last section of Professor F. M. Burnet's inaugural address, published in this journal on December 14, 1946, the significance of the whole event becomes clear.

Subjects considered at the Royal Society Empire Conference included Empire problems in agricultural science and nutrition, physiological and psychological factors affecting human life under tropical conditions, the control of infectious diseases, modern methods of mapping and exploration by air, means of obtaining uniformity in standards of physical measurement, the collection of scientific records and material such as plants, seeds and animals, land utilization and conservation throughout the Empire, the survey of mineral and natural resources of the Empire, and the chemical industries which might be

based on the latter. In addition, recommendations were considered dealing with research on cosmic rays, fisheries, oceanography, geo-chemistry and other subjects. Resolutions adopted at the Royal Society Conference were passed on for further study at the Official Conference.

At the Official Conference consideration was given throughout to the question of suitable machinery for initiating action for the calling of specialist conferences and for following up the recommendations and decisions of the conference after it had dispersed. A standing committee was therefore established together with a secretariat and "working party". According to its terms of reference, the standing committee will "consider the best means of ensuring the fullest possible collaboration between the Government scientific organizations of the Commonwealth and Empire". In addition, it was resolved that scientific liaison offices should be established at London and in North America. These will be concerned with the machinery for facilitating exchange of scientists and activities connected therewith. It will be noted that the standing committee is to be concerned with collaboration between governmental scientific organizations, but the conference agreed that the services of liaison offices should be available to all scientific organizations and to individual scientists to assist in facilitating inquiries or visits to such an extent as might be appropriate. Another satisfactory proposal by the Government of the United Kingdom dealt with scientific representation in certain specified foreign countries or regions. The conference decided to invite the attention of other governments and scientific institutions concerned to these plans with a view to any practicable application. This brings us to the view expressed in one resolution that interchange of scientific staffs, both of universities and of research institutions, is of vital importance to the maintenance and development of scientific research within the Commonwealth and Empire. The details set out in connexion with this recommendation must be left for another occasion. Suffice it to observe that the interchange of medical personnel between different countries is a measure that has been advocated in these columns on previous occasions. It should also be noted that the conference was insistent that cooperation should be maintained between the Empire and existing and projected international organizations in the scientific field.

In regard to the medical sciences, important decisions and recommendations were made. First of all it was recommended that in each Dominion there should be a body sponsored by the Government and charged with the responsibility for the stimulation, support and organization of medical research. Further, it was resolved—and this should be brought forcibly to the notice of Australian governments—that this body should be composed predominantly of persons experienced in medical and scientific research and should possess an executive head of similar experience. This body should also have funds at its disposal not only to support adequately fundamental and applied medical research within the Dominion and its sphere of influence, but also to maintain effective arrangements for the movement of scientists to and from other parts of the British Commonwealth and for the fullest exchange of information. The conference decided that the development of certain work was desirable. It surveyed

¹ British Commonwealth Scientific Official Conference, London, 1946. Report of Proceedings. London: His Majesty's Stationery Office. 9½" x 6", pp. 78. Price: 1s. 3d. net.

certain of the results obtained during the war in the laboratories of the Medical Research Council in Cambridge and London and in the department of physiology of the University of Queensland, and urged that study should be directed to the physiological and psychological factors affecting human life under tropical conditions and in industry. Other subjects on which stress was laid included the aetiology and control of infectious and transmissible diseases and the science of nutrition and special problems of the Empire, including the nutritional status of the indigenous peoples of the colonies. In regard to the last-mentioned subject, one paragraph reads as follows:

The Conference recognizes that the improvement of the nutritional status of the peoples of the Commonwealth is a part of general, social and economic policy in the territories concerned. It urges the necessity for developing at all levels of Dominion and Colonial government a proper awareness of the nutritional needs of the indigenous people.

It was decided that the recommendations on these other matters should be sent to the United Nations Organization.

Mention has been made of Professor Burnet's address and of his remarks about the conferences that have been discussed. It may give some people a shock to see that he describes as "very sobering" the fact that in the last decade the means have been made available to eliminate the major causes of infantile mortality throughout the world. Professor Burnet believes—and he has good grounds for believing—that the major political happenings of the next hundred years will be determined by the relative speeds with which, on the one hand, preventable infectious disease is eliminated and, on the other, knowledge of means of population restriction is made generally available. One of the major impressions which Professor Burnet brought back to Australia from the Empire science conferences was "the necessity for the full realization by those responsible for national policy of the basic realities of human ecology". (Ecology he defined as the science which is concerned with the study of the interactions of plants and animals, considered either as individuals or as communities, with their environment and particularly with the other living organisms of their environment.) He referred to the economic basis of agriculture, to food habits which render theoretically perfect diets wholly unacceptable, and to the population pressure in India and China which dominates the whole problem. He has every justification for wondering to what calamity the full application of science to such countries would lead. But the medical sciences must advance; and preventive medicine will be applied in wider and wider spheres. When we think of "the basic realities of human ecology" and of other necessary studies that should go with preventive medicine, we must ask ourselves whether Australia as a nation, in company with other nations, is not spending too much time and dissipating too much energy on what are really minor matters of the moment and paying too little heed to larger questions that affect the well-being of the nation and of all humanity. Conferences are useful—the Empire conferences ought to be productive of far-reaching results. But as the Right Honourable Herbert Morrison remarked in opening the second conference, it is possible to pay too much attention to organization. It is the will to cooperate that counts, and when it is present, results often follow naturally. If any good is to be achieved by the determinations of the Empire conferences, all who have under-

standing of their range and of their significance will have to become advocates and missionaries among those with whom their lot in life is cast.

Current Comment.

UNEXPLAINED HYPERTROPHY OF THE HEART.

OCCASIONALLY cardiac failure occurs in young people who have been apparently healthy, and hypertrophy and dilatation of the heart cannot be traced to any convincing cause. Other unexpected instances of death from heart failure are seen in which a long bout of tachycardia of the paroxysmal variety ends fatally, and yet autopsy may not help to reveal the underlying pathology. Commander R. F. Norris and Lieutenant-Commander H. H. Pote report four cases of hypertrophy of the heart seen in young men treated in a naval hospital in which full investigation before death and at post-mortem examination revealed no significant aetiological factors.¹ All the men had been under medical observation for at least two years, and at no time was there any evidence of arterial hypertension or valvular disease of the heart, nor was there any ascertained sign of hypertrophy of the heart until the terminal illness. In each instance death followed congestive failure, though this was of short duration only in one patient. The authors can find reports of only a few cases in the literature, but there must have been more than are reported, for there is some natural reluctance on the part of practitioners to commit to paper what seem to be purely negative observations.

All the patients were under the age of thirty years and had been accepted for one or other of the armed services. Their case histories are detailed by the authors, but there are few common factors that might suggest a cause. There was one feature identical in each instance, that at first serious heart disease was not recognized as the outstanding abnormality. The clinical features differed in each case. Only in one might an acute infection have been at all relevant, but the connexion, if any, was not evident. One patient had suffered from an unexplained hypochromic anemia which responded to treatment. Another had a fainting attack as the first symptom, which seems like an exception to one of the old aphorisms about cardiac disease. The remaining patient had terminal jaundice; it seems very unlikely that this was of infective origin, but rather of the type seen in circulatory failure, especially in association with infarcts of the lungs. The electrocardiographs did not shed much light on the subject, as they merely indicated a severe defect of function of no specific kind. Autopsies revealed no satisfactory cause for so severe a disruption of circulatory function. There seemed to be no evidence of nutritional defects, or of arterial disease, or of a myocarditis of recognizable degree or type. Hypertrophy was found in all the hearts, as evidenced by weighing and also by microscopic muscular changes. No anatomical lesions characteristic of rheumatic or other myocardial or endocardial infection were found.

The authors point out that there is no warrant for thinking that the cause of the cardiac affection was the same in each case. The question of cause seems to remain unanswered. It is suggested that whereas we know that myocarditis may occur in some diseases with recovery, we do not know if such a condition may not sometimes start a change that may not be reversible. But we must admit that our knowledge of a true myocarditis is based on slender evidence in many cases, for we can be sure of its presence only when we see the cellular changes *post mortem*; otherwise it is a matter of inference only. How can it be proved what degree of myocarditis is recoverable? A good deal has been written on focal myocarditis, but little is known of its natural history, nor is there complete

¹ *American Heart Journal*, November, 1946.

understanding of the genesis of heart failure. Even if a tissue change is not recoverable in the focal sense, in other words if it leaves significant scarring, we are not able to say with confidence that it may set up a progressive or irreversible process. Perhaps the concept of a chronic infection might be invoked. But such a discussion is likely to prove unprofitable, as it really rests on the character of a tissue not proved to be pathological, but assumed to be so on rather flimsy grounds. It would be interesting if any such cases could be investigated in even greater detail, especially with regard to the histological anatomy and chemistry.

NEOPLASTIC CELLS IN THE RESPIRATORY PASSAGES.

In his book, "The Spread of Tumours in the Human Body", R. A. Willis states that because the respiratory tract contains no digestive enzymes and fewer bacteria than the alimentary tract, the occurrence of implantation metastases is intrinsically less improbable in the bronchi and lungs than in the stomach and intestines. At the same time he points out that conditions unfavourable to tumour grafting in this situation must be the mucoid character of bronchial secretion, the presence of an appreciable bacterial flora, and the mechanical hindrances to the effective lodgement of foreign particles presented by the respiratory movements and the ciliary activity of the respiratory epithelium. Willis is therefore not surprised to find that most of the alleged instances of implantation metastasis by way of the air passages are susceptible of other explanations. He refers to claims by Moxom in 1869 and by Godlee in 1876 that pulmonary metastases had arisen from inhalation of tumour particles. He thinks that the claim for the aerial route of metastasis in these cases could equally well be made for any other growths involving the upper respiratory passages and yielding pulmonary metastases. In his opinion dissemination to the lungs by way of the venous blood stream is responsible for the great majority of these tumours. Among those who have suggested that aspiration of tumour fragments by way of the bronchi may play a part in the dissemination of tumours from one part of the lung to the other or to the opposite lung, are Zenker (1890), Pässler (1896), Eismayer (1924), Letulle and Jacquelin (1924) and Atkin (1931). Though Willis does not find the evidence for this occurrence conclusive, he states that it is not impossible that in some instances dissemination of tumours within the lungs themselves may take place partly by an aerial metastasis. Convincing demonstration of the occurrence of this process in human beings is necessarily, he adds, difficult or impossible. As far as he is aware no animal experiments have been performed with the object of demonstrating the inoculability of the lungs to tumours by way of the air passages.

Writing from Cornell University Medical College and New York Hospital, J. Furth records some interesting experiments on mice.¹ He mentions a post-mortem study of a patient who had suffered from a slowly progressing malignant adenoma of the trachea. He noted tumour nodules surrounding and stenosing several bronchioles in addition to the usual perivascular lymphatic metastases. In a biopsy specimen taken four years before death squamous metaplasia of the normal ciliary epithelium was found which it was thought might have been sufficient to break down the barrier to penetration of foreign particles to the alveoli. Furth's experiment consisted in the instillation of a few droplets of neoplastic cells into the nostrils of healthy young mice which were anaesthetized with ether. The fate of the neoplastic cells presented considerable variation. At one extreme carcinoma cells of a particular strain produced progressively growing tumours in both lungs and caused death by displacement of the parenchyma of the lungs. At the time of death gross examination disclosed metastases which were confined to the regional lymph nodes. The other extreme

of invasiveness was represented by malignant lymphocytes which produced systemic disease without leaving any mark at the point of entry into the circulation. Between these two extremes were many other grades of invasiveness. The cells produced massive peribronchial infiltrations with small or minute tumour-like nodules in the lungs, particularly in the hilar and apical regions, and moderate or extensive involvement of the nodes draining the area. In many instances pulmonary infiltrations extended beyond the pleura, causing massive pleural effusion and occasionally extensive pericardial infiltrations. Furth points out that many neoplastic cells doubtless perish after intranasal introduction and that occasionally all the cells perish. He thinks that ability to survive in the circumstances as well as the degree of invasiveness is an inherent characteristic of the cells.

In commenting on his observations Furth points out that although the appearance of neoplastic cells in the sputum is well established, very little use is being made of this fact in diagnosis. This, however, is beside the main point of the communication. That many of the cells which were introduced into the nostrils perished is easily explained for the reasons quoted from Willis's book. In his discussion on metastasis by implantation on epithelial surfaces generally Willis quite rightly states that before the assumption of implantation metastasis is adopted in any given case, it is essential to inquire whether the supposed implant tumours may not be either multiple primary growths or metastases by other routes, lymphatic, transcoelomic or haemic. It is for this reason presumably that he rejects the suggestion that in a case reported by Atkin contralateral metastases were due to aspiration of tumour fragments from one lung to another. Atkin describes the growth as squamous-cell carcinoma with a great tendency to liquefaction. Furth's observations, if they do nothing more, will redirect attention to work such as that of Atkin. It would seem that the type of cell has something to do with what happens. Furth points out that the bronchial epithelium in his animals was in most cases preserved and that it was lifted up from the underlying structures by the neoplasm. No conspicuous ulceration of the mucosa was seen and the site of penetration was not evident. All that can be said at present is that these observations are important and that they should be confirmed by other workers.

AN UNUSUAL GIFT TO A UNIVERSITY.

A VALUABLE and most unusual gift has been made to the University of Edinburgh.² On December 13, 1946, the title deeds of the celebrated printing firm of Messrs. R. and R. Clark, of Edinburgh, were handed to Sir John Fraser, Principal and Vice-Chancellor of the university. This gift of the firm as a going concern has been made by the trustees of the will of the late Mr. Edward Clark, son of the founder. The clause in the will was a discretionary one; the testator granted his trustees full discretion in deciding the future of the concern, and we read that their decision has been inspired by Mr. Clark's lifelong support of educational institutions. The title deeds were handed over by Mr. Douglas Muir-Wood, chairman of the firm, and he was accompanied by Mr. William Maxwell, managing director, who has been associated with the firm for fifty-five years. It is expected that the operations of the firm which will continue as before will bring a considerable annual income to the university. The firm, which celebrated its centenary last November, has printed the books of many famous authors from Sir Walter Scott onwards, and *The Times* states that when Mr. Bernard Shaw consented to the recent issue of ten "Penguin" volumes of his work to mark his ninetieth birthday, he made it a condition that they should be printed by Clark, of Edinburgh. The trustees of R. and R. Clark have set a noble example to those who control the destinies of other proprietary concerns.

¹The American Journal of Pathology, November, 1946.

²The Journal of Pathology and Bacteriology, Volume XXXIV, 1931, page 347.

³The Times, December 14, 1946.

Abstracts from Medical Literature.

GYNÆCOLOGY.

Torsion of Adnexal Tumours and its Relation to Surgical Emergency.

MELVIN R. KELBERG AND J. H. RANDALL (*American Journal of Obstetrics and Gynecology*, September, 1946) report 42 patients suffering from non-inflammatory adnexal tumours with torsion of the pedicle confirmed at laparotomy. They discuss the advisability of immediate operation for all patients with twisted pedicle tumours. Of the 42 patients, one was prepubertal (aged thirteen years) and seventeen were post-menopausal. The onset of symptoms was sudden in 23 and gradual in 19 cases. The most common symptoms were tumour, nausea and vomiting, and the most significant physical finding was acute lower abdominal tenderness usually associated with muscular rigidity. Abdominal palpation revealed a mass in 35 cases. The febrile reaction and leucocytic response were not features of the condition. Torsion appears to occur equally in either direction, but in this series of patients the right adnexa were more commonly involved. Pseudomucinous and serous cystadenomata, dermoids and fibromata were most frequently encountered, but apparently any cystic or solid pedunculated mass may become twisted. Patients with twisted pedicle tumours may be acutely ill or may develop a semi-chronic disability. Operation is well tolerated and post-operative recovery is usually rapid and uncomplicated. A clinical diagnosis of twisted pedicle demands operative interference, but not as an absolute emergency; when the diagnosis is doubtful a period of observation does not increase the risk to the patient.

Chorionepithelioma in an Eighteen-Year-Old Primigravida.

JOHN R. DURBURG (*American Journal of Obstetrics and Gynecology*, September, 1946) reports a patient, aged eighteen years, with chorionepithelioma whose condition presented definite diagnostic difficulties. A period of three months' amenorrhoea and signs of abortion were followed by the passage of grape-like clusters identified as hydatidiform mole. Curettage was performed and biopsy showed no evidence of malignant disease. Repeated attacks of severe uterine haemorrhage associated with fever of uncertain origin followed a few months' quiescence, and despite the patient's age, two "negative" diagnostic curettages and two negative responses to the Friedman test, a diagnosis of chorionepithelioma was made. Abdominal hysterectomy was performed and no metastases were seen in the abdomen. Metastasis of the uterus after removal showed a localized tumour mass in the myometrium of the fundus, 5.5 centimetres in diameter, which was histologically a chorionepithelioma. Three months after operation the pelvis was clear on examination, the Friedman test gave no reaction and there were no secondary deposits in the lungs. The Friedman test is valuable, but not conclusive in the diagnosis of chorionepithelioma. Negative results are thought to be due to thrombosis of maternal vessels which prevents the escape of trophoblast into the blood

stream. When the tumour is interstitial, curettage of the uterus can be useless as a diagnostic measure. Fevers and rigors following uterine haemorrhage in patients with chorionepithelioma are most likely due to necrosis of the tumour and do not respond to penicillin or chemotherapy.

Primary Carcinoma of the Fallopian Tube.

QUOTING Cameron, "The condition is so rare that many gynaecologists never see it", G. Bancroft-Livingston (*The Journal of Obstetrics and Gynecology of the British Empire*, October, 1946) reports four cases of carcinoma of the Fallopian tube in which treatment was carried out at the Middlesex Hospital, and reviews the world literature. The disease has its heaviest incidence at the menopause and in the years succeeding it, and previous inflammation and associated tuberculosis are suspected aetiological factors. The carcinoma usually arises in the middle or outer portions of the tube and is bilateral in about one-third of cases. The histological type is generally papillary and peritoneal metastases are rare. The physical signs are not characteristic; lower abdominal pain, watery or blood-stained vaginal discharge, sometimes varying in amount with colic, and a lateral pelvic mass should arouse suspicion of tubal malignant disease. The presence of ascites is uncommon in this condition in contradistinction to carcinoma of the ovary. A correct pre-operative diagnosis is rare. The prognosis is poor in almost all cases, the overall five-year cure rate being not more than 4%. Radical surgery is the most common form of treatment and deep X-ray therapy has a doubtful value.

A Seven-Year History in Early Cervical Cancer.

H. C. TAYLOR, JUNIOR, AND H. B. GUYER (*American Journal of Obstetrics and Gynecology*, September, 1946) report a patient with early carcinoma of the cervix with a proven pre-clinical stage of seven years' duration, and discuss the case in reference to the natural history of cervical cancer. The patient had biopsy in 1933 and the histological features of early non-invasive cancer were not recognized. The operation of subtotal hysterectomy was performed. Routine examinations of the cervix were made at six-monthly intervals, and in 1945 a proliferating nodular erosion of the cervix was found. Biopsy revealed a squamous carcinoma with invasion. The original slides from the biopsy taken in 1933 were reviewed and the paraffin block was completely sectioned. It was agreed that there was then sufficient variation in size, shape and staining properties of the squamous cells to justify a diagnosis of carcinoma. Only after serial sectioning of the tissue block was it possible to diagnose invasive carcinoma. The outstanding observation is the length of time (seven years) which elapsed between the origin of the early microscopic lesion and the appearances of clinical carcinoma. It is known that cancer of the cervix may be latent for years with no local tissue infiltration discernible microscopically or clinically. Difficulty lies in the diagnosis and interpretation of early non-invasive lesions and there is a difference in concept whether such lesions are carcinoma from the start or a precursor stage of carcinoma. The

case quoted affords further evidence in favour of complete hysterectomy as opposed to subtotal hysterectomy whenever the cervix is not normal.

One Hundred Cases of Ovarian Cancer.

E. V. HELSEL (*American Journal of Obstetrics and Gynecology*, September, 1946) presents a clinical review of one hundred cases of ovarian cancer and makes observations on the influence of the histological grading, clinical grading and nature of treatment on the survival rate. The gross appearance of ovarian cancer is often bewildering and an attempt to classify cancers as solid or cystic is unsatisfactory. In this series the majority of tumours seemed to arise from papillary cystadenomata; distant metastases were uncommon and 44 patients had ascites at the time of operation. The average age of patients was forty-seven years and 44% were still menstruating. Twenty-four patients were single and among the married women there was a high incidence of sterility. The insidious onset and progress of the tumour are shown by the fact that 68% of all patients were considered incurable when first seen. Symptoms occur so late that early diagnosis is almost impossible. Abdominal pain, abdominal enlargement, loss of weight, abnormal vaginal bleeding and a palpable tumour were the chief symptoms and signs. Surgery was attempted in the case of all but five patients whose condition was considered utterly hopeless; from 76 patients more or less of the primary and metastatic growth was removed. The average survival time after operation combined with radiation was 35.3 months, after operation alone the time was 11.7 months, and after radiation alone 1.5 months. Histological grading proved of little importance in prognosis, but clinical grouping seemed to be of some importance. The survival time was three times as long when all the tumour could be removed. The degree of eradication of the growth combined with the use of radiation therapy determines the survival time.

An Analysis of 257 Cases of Sterility.

S. G. WINSON (*American Journal of Obstetrics and Gynecology*, October, 1946) records investigations and results of treatment of 257 patients suffering from sterility. Of the 257, 79.4% had primary sterility and 20.6% had secondary sterility and the average duration of sterility was five years. The method of investigation included a complete physical examination, full blood count, examination of the urine, the examination of the blood by the Wassermann test and chemical examination of the blood and of cervical smears. Special examinations included a Hühner test to determine whether semen is deposited, whether there is adequate invasion of the cervical canal and whether there is any hostility of the cervical secretions. A Rubin test with or without hysterosalpingography, endocrine studies including endometrial biopsy, vaginal smears and oestrogen determinations were carried out when necessary. After thorough investigation of the causal factors involved, these were evaluated and therapy was instituted. Gross pelvic pathological change was found in 6.6% of patients and tubal damage was the commonest single cause of sterility. All patients received pelvic

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diathermy and oestrogen therapy for one month and uterine insufflations monthly. Lipiodol instillations were given when other modes of therapy failed, and of 35 patients thus treated 34.2% conceived. The cervical factor, that is, failure of deposition of spermatozoa by fertile mates or inadequate invasion of the canal, was an important cause of sterility in 38% of cases. The presence of a pinhole os with viscid mucus and endocervical polypi commonly caused failure of spermatozoa to reach the cervical canal. Of patients suffering from the cervical factor 75% conceived after appropriate treatment. Endocrine disturbances alone or in combination with other causes were present in 134 patients, and of these 42% conceived following appropriate therapy. For amenorrhoea low dosage irradiation of the pituitary and ovary was the most effective form of treatment combined with small doses of thyroloid. Eighty-two patients were treated for anovular menstruation and 50% conceived. The husband was partly or wholly at fault in 41% of the cases. Absolute sterility in the male was rare, but oligozoospermia and necrozoospermia comprised 81% of the male infertility. Overall results of the 257 cases studied showed that 50% conceived, and among the pregnancies there were seven abortions and one ectopic gestation.

OBSTETRICS.

The Clinical Diagnosis of Varying Degrees of Contraction Rings.

HERMAN W. JOHNSON (*American Journal of Obstetrics and Gynecology*, July, 1946) is convinced that the delay in some otherwise normal labours is often caused by subclinical uterine rings. The author advises the adoption of standard nomenclature, according to which all rings are termed contraction rings instead of the confusion caused by the terms retraction, contraction and restriction. Apart from obstructed labour, contraction rings can develop at any time in labour from the beginning, late in the first stage or even during the second stage, and cause dystocia. The patients come into the hypertonic introvert class, and although the labour pains seem adequate, the cervix dilates only very slowly, with corresponding urgency in the complaints of the patient. Despite rest, the pains become even more colicky in nature and the uterus sensitive to palpation. After thirty or more hours of labour the head will be found to be in the mid-pelvis with the cervix loosely applied as a drape and four to five centimetres dilated. If there is no other obstruction to delivery except the contraction ring which is preventing further progress of the head, delivery is now effected by forceps, or if a loop of cord is in the lower uterine segment, by version and extraction. Either and chloroform to the point of deep surgical anaesthesia are required to relax the ring on which adrenaline has no effect.

Continuous Spinal Analgesia in Caesarean Section.

CONTINUOUS spinal analgesia has been used by J. C. Ullery in 300 deliveries by Caesarean section with no maternal deaths (*American Journal of Obstetrics and Gynecology*, July, 1946). The advantages of this form of analgesia are: (1) Smaller initial doses of anæ-

thetic are required and can be withdrawn at will. (2) A dose of the drug which is minimal, sufficient only for the operation and controlled, is used. (3) Administration is easy. (4) The procedure is speedy. (5) Post-operative complications such as nausea, vomiting, abdominal distension and pulmonary complications are less. (6) The uterine muscle contracts readily following delivery with minimal blood loss. (7) The baby is not narcotized and does not need resuscitation. (8) The abdominal wall musculature is well relaxed. (9) There is no disturbance in maternal respiratory, genito-urinary, or circulatory pathological tissue due to the low toxicity of the agents used and the minimal dose employed. The technique which leaves the spinal needle *in situ* and comprises essentially an intermittent injection of the drug is described. The total dosage of drug used, procaine or "Metycaine", varied from 15 to 200 milligrammes. Five patients required intravenous injection of saline solution or plasma on the operating table, and there were nine cases of failure to complete the operation under continuous spinal analgesia due to technical failure to insert the needle. Post-operative headache occurred in 5% of the cases.

The Relationship of Maternal Weight Gain to the Weight of the Newborn Infant.

JOSEPH KLEIN (*American Journal of Obstetrics and Gynecology*, October, 1946) presents a statistical study of 567 single pregnancies in which the patient began ante-partum care prior to the twelfth week of gestation and was observed regularly to term, was spontaneously delivered of a normal living infant and had no preexisting disease. He concludes that: (1) There is no relation between the maternal weight gain during pregnancy and the weight of the baby at birth. (2) The average birth weight of males exceeds that of females. (3) There is no relationship between the age of the mother, her weight gain during pregnancy and the weight of the newborn infant. (4) Although the average maternal weight gain and the average weight of the newborn babies of *multiparae* were greater than those of *primiparae*, the differences were slight and of no significance.

Hypoxaemia of the Foetus.

HERBERT F. TRAUT (*The Western Journal of Surgery, Obstetrics and Gynecology*, October, 1946) reviews the causes and effects of the lack of available oxygen to the foetus *in utero*. The hemo-chorial-villus placenta of the human race is the most imperfect in nature. The disappearance of Langan's layer in the later months aids the transfer of gases, salts and sugars, and the slowing of the maternal blood stream allows the proteoses and polypeptides to be broken down into amino acids by the placental enzymes and thus to become available to the foetus. Compensation also occurs by an increase in the number of the foetal red cells, whose haemoglobin can combine with oxygen and discharge carbon dioxide more rapidly than in the human adult. As the placenta reaches its full size whilst the foetus is small, the latter is generally not embarrassed until the last trimester, when the oxygen saturation of the foetal blood falls from 50% to 28%. Anaerobic breakdown of placental glycogen supplies may be a

source of oxidative potentials. The pathological degeneration of the syncytium in these latter months with fibrin organization increases the foetal hazard. This senile change is sometimes familial and can cause death *in utero*, premature labour and malnourishment of the foetus. The condition is often associated with toxæmia of pregnancy and poor maternal nutrition. The foetus which has suffered hypoxaemia at or near term may have subnormal intelligence, locomotor difficulties or epilepsy in later life. The author issues a warning against the use of opiates, barbiturates, paraldehyde or nitrous oxide as analgesics when the foetus is showing signs of oxygen lack, and the use of inhaled oxygen for the mother in these cases particularly when labour is rapid or there is ante-partum hemorrhage.

The Pelvic Floor in Parturition.

RICHARD M. H. POWER (*Surgery, Gynecology and Obstetrics*, September, 1946) describes the pelvic floor as consisting of five diaphragms from above downwards: (a) the endopelvic fascial diaphragm or upper pelvic fascial floor, (b) the smooth muscle diaphragm in the base of the broad ligament, (c) the levator ani muscular diaphragm, (d) the urogenital diaphragm, (e) the sphincteric group at the vulval outlet. The smooth muscle diaphragm between the endopelvic fascia and the levator ani muscle permits stretching of the connective tissue diaphragm with return to the normal post-partum state. The endopelvic fascia spans the pelvis like a hammock, transversely from levator ani white line to levator ani white line, and antero-posteriorly from the symphysis pubis to the second and third sacral vertebrae, interrupted centrally by the urethra, cervix and vagina, and the rectum, the supra-vaginal part of the cervix being the central pivotal attachment. The imperfect smooth muscle diaphragm which is embedded in fibrous tissue lies between the endopelvic fascial diaphragm of the superior surface of the levator ani muscle, radiating from the uterus at the level of the internal os. It can be divided into lateral, anterior and posterior groups of fibres. During labour the foetus makes three turns, one at the inlet, the second at the ischial spines and the third on the balcony of soft parts beyond the bony pelvis. The muscular segments of the pelvic floor react by increased oscillations, assume a horizontal plane temporarily and then a vertical plane. As the vagina dilates, the cranial leaf of the urogenital diaphragm is pulled upwards and the caudal leaf is pushed downwards as the head is propelled along the axis of the pelvic outlet. The sphincteric group of muscles are dilated and converted into a short muscular tube and with the bulging of the perineum the coccyx and ano-coccygeal raphe are displaced downward and backward, pulling the anus open in D-shaped fashion. The attachment of the fascia to the lower uterine segment is important during labour, as conjointly the two guide the foetal pole into and through the pelvis during parturition. The lateral and caudal attachments of the fascial diaphragm moor the uterus not only to the levator ani white line, but to the composite structure of the pelvic floor and the bony pelvic canal. Deficiencies in this fascial sheath are reflected in maladjustments of the presenting part.

Bibliography of Scientific and Industrial Reports.¹

THE RESULTS OF WAR-TIME RESEARCH.

During the war a great deal of research was carried out under the auspices of the Allied Governments. It has been decided to release for general use a large proportion of the results of this research, together with information taken from former enemy countries as a form of reparations. With this end in view, the United States Department of Commerce, through its Publication Board, is making a weekly issue of abstracts of reports in the form of a "Bibliography of Scientific and Industrial Reports". This bibliography is now being received in Australia, and relevant extracts are reproduced hereunder.

Copies of the original reports may be obtained in two ways: (a) Microfilm or photostat copies may be purchased from the United States through the Council for Scientific and Industrial Research Information Service. Those desiring to avail themselves of this service should send the Australian equivalent of the net quoted United States price to the Council for Scientific and Industrial Research Information Service, 425, St. Kilda Road, Melbourne, S.C.2, and quote the PB number, author's name, and the subject of the abstract. All other charges will be borne by the Council for Scientific and Industrial Research. (b) The reports referenced with an E number may be obtained in approved cases without cost on application to the Secondary Industries Division of the Ministry of Post-War Reconstruction, Wentworth House, 203, Collins Street, Melbourne, C.I. Copies of these are available for reference in public libraries.

Further information on subjects covered in the reports and kindred subjects may be obtained by approaching the Council for Scientific and Industrial Research Information Service, the Secondary Industries Division of the Ministry of Post-War Reconstruction, or the Munitions Supply Laboratories (Technical Information Section), Maribyrnong, Victoria.

PB 1687. U.S. WAR DEPARTMENT. OFFICE OF THE SURGEON-GENERAL. GAYLORD W. ANDERSON, LT.-COL. Silicosis. Dec. 4, 1945. 324 pp. Price: Microfilm, \$3.50; Photostat, \$22.00.

This report is on a microfilm roll containing eight articles, seven in German and one in English, on various aspects of the problem of silicosis in miners. The list of articles on the roll is as follows: 1. Matthiass, and Landwehr, M. *Neuere Beobachtungen auf dem Gebiete der Silikosebekämpfung.* (Recent observations on the fight against silicosis.) *Silikose-Forschungsstelle der Knappschafts-Berufsgenossenschaft, Mitteilung I.* Bonn, 1937. 95 pp. 2. Matthiass, and Landwehr, M. Results of investigation. *Ibid.*, Report III. Bonn, 1939. 87 pp. (In English.) 3. Siegmund, H. *Über die Entstehungsbedingungen silikotischer Schwielen und ihre Erzeugung im Tierversuch.* (Conditions for the development of silicotic indurations, and their production in animal experimentation.) Reprinted from *Verhandlungen der deutschen pathologischen Gesellschaft*, 1934, 262. 19 pp. 4. Leidenrath. *Versuchsstand der Hauptstelle für Staubbekämpfung im Bergbau.* (Condition of research at the head office for the prevention of dust in coal mining.) No date. 2 pp. (Typewritten MS.) 5. Landwehr, M. *Untersuchungen zur Klärung der Frage des Auftretens von Staublungenerkrankungen bei reinen Kohlenhauern auf dem steinkohlenbergwerk Consolidation im Gelsenkirchen II.* (Studies for clarification of the incidence of silicosis among miners in the Consolidation mine at Gelsenkirchen II.) No date. 60 pp. (Typewritten MS.) 6. Landwehr, M. *Das Tyndallometer im Dienste der Silikoseforschung.* (Use of Tyndallometer in research on silicosis.) Reprinted from *Festgabe (anniversary volume) für Ernst Leitz*. No date. 11 pp. 7. Landwehr, M. *Silikoseforschung an Gesteinen und Stauben.* (Study of rocks and dust in research on silicosis.) Reprinted from *Umschau*, no. 3 (1942). 4 pp. 8. Landwehr, M. *Die wissenschaftlichen Arbeiten zur Bekämpfung der Staublungenerkrankung (Silikose) der Bergleute und Forschungen zur Erklärung der Entstehung der Silikose im gewerblichen Betriebe.* (Scientific studies on prevention of silicosis in miners, and attempts to explain its incidence in industrial enterprises.) No date. 46 pp. (Typewritten MS.)

PB 20504. HAAGEN, E. (Deutsche Forschungsgemeinschaft. (Correspondence of the director, Institute of Hygiene, Strass-

burg, and memoranda on virus research.) (ALSOS Mission, Haagen I.) 1943-1944. 221 pp. Price: Microfilm, \$2.50; Photostat, \$15.00.

This file contains a long report to the *Reichsforschungsrat* by Professor E. Haagen, of the Hygienic Institute of the "Reichsuniversität Strassburg", on virus infection. A method for the preservation of lymph for use against spotted typhus is briefly described. The file also contains a correspondence with Professor Hallervorden, of the Institute for Brain Research at Berlin-Buch on *encephalitis epidemica* (Economo).

PB 27062. LOVEFACE, W. R. II. Summary of German aviation medical research. (AAF ATSC Eng. Div. Memo. Rept. TSEAA-660-99.) Feb., 1946. 49 pp. Price: Microfilm, \$1.00; Photostat, \$4.00.

This is a summary of developments in German aviation medicine. In this report are covered first the tolerance of humans to accelerative and decelerative forces of magnitudes from 2g to more than 6g and second parachute design to reduce opening shock. In addition, the subjects of physiological effects of pulsating pressure wave, of low temperature and rapid heat treatment, of low barometric pressure, and human engineering are discussed. The appendix contains reports covering the first two subjects mentioned and a general bibliography on all the topics mentioned above.

PB 25636. MONROE, L. A., and ROBTSCHKE, F. O. Utility of dibromosalicyl; also *Streptobacterium plantarum* strain 10-S. (FIAT Final Rept. 590.) Dec., 1945. 2 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

This brief report describes the result of a second visit to Dr. Kuhn in Germany. Uncompleted tests on mice and guinea-pigs indicate that dibromosalicyl is effective against diphtheria, dysentery, and Rocky Mountain spotted fever. The formula for a culture medium for *Streptobacterium plantarum* strain 10-S as used in Dr. Kuhn's laboratory is given.

PB 22461. PAVCEK, P. L. *Chemisch-Physikalische Versuchsanstalt, Dänisch Niehof/Kiel.* (FIAT Evaluation Rept. 1095; FIAT Final Rept. 198.) Aug., 1945. 2 pp. Price: Microfilm, 50c; Photostat, \$1.00.

Dr. Bitterling and Dr. G. von Studnitz had done some preliminary work on the utilization by humans of the carotenoid pigments in a German flower known as the "Studentenblume". Human assay tests were performed, using improvement in night vision as a criterion. This report consists of a summary of a report (prepared in 1944) by G. von Studnitz, H. Wigger and H. K. L. Loevenich on "Influence of carotenoids on dark adaptation in man". The growing of the flower, *Tagetes patula flore pleno*, and the extraction of the principal ingredients, mainly lutein, are described. The dose is administered orally. The lutein effect was distinct from that due to the β -carotene present.

PB 22793. U.S. NAVY DEPT. DIV. OF NAVAL INTELLIGENCE. The cause of immediate death in blast injury and the pathogenesis of explosive decompression. Feb., 1946. 1 p. Price: Microfilm, 50c; Photostat, \$1.00.

This short preliminary note records impressions received by a British official of the work of Professor Benzinger and Dr. Desaga, who showed that air embolism can cause death following blast injury. The table detonation charge for the production of air emboli in air and in water is lacking.

PB 22455. PAVCEK, P. L. *Kaiser Wilhelm Institut für Arbeitsphysiologie, Dortmund.* (FIAT Evaluation Rept. 1094; FIAT Final Rept. 192.) August, 1945. 2 pp. Price: Microfilm, 50c; Photostat, \$1.00.

The investigator summarizes information obtained from workers at the Institute. Dr. Kraut explained the functions of the Institute and its work in the field of physiological research. Routine determinations on food and amino acids were conducted. In Dr. Mueller's laboratory an instrument for the measurement of pulse rate and for rate of flow in a vein was briefly noted. Dr. Droese's work was on thiamin requirements for human beings. No details of the work of these men are given.

PB 1693. REICH, HORST. *Die Infektion und Regeneration des frischen Knochenbruchs unter besonderer Berücksichtigung der Marknagelung nach Küntscher.* (Infection and regeneration of fresh bone fractures, with special reference to Küntscher's method of nailing the bone marrow.) Dec., 1945. 104 pp. Price: Microfilm, \$1.50; Enlarg. print, \$7.00.

The author discusses the problems of infection and regeneration of bone tissue following the use of Küntscher's method of nailing the bone marrow in treatment of fresh open and closed fractures of bone shafts, and, in the light of his experiences in the surgical clinic at Kiel University, evaluates the effectiveness of this new method in comparison with the old conservative and surgical methods. Experimental and histological data are presented to show the details of the course of healing in infection and regeneration under the new method. Although infections, chiefly in the

¹Supplied by the Information Service of the Council for Scientific and Industrial Research.

form of traumatic osteomyelitis, are of comparatively rare occurrence in closed fractures treated by bone marrow nailing, and the mortality from such infections is much lower than that following conservative therapy, the author is opposed to the indiscriminate use of "open" nailing of the bone marrow in this type of fracture, because of the almost unavoidable danger of relapse. In fresh open fractures, however, the danger of relapse with this method of treatment is no greater than with conservative therapy. The new method is simpler than the old, and the course of healing is more rapid. The end results are much better, even when a stable osteosynthesis cannot be obtained. (In 92-95% of the cases treated at Kiel Clinic the fractured extremity was saved and the life of the patient preserved.) The extensive callus formations noted in the bone marrow along the length of the nail Reich regards as being of connective tissue origin. The nature and course of osteitis, traumatic osteomyelitis, and ring-type and crown-type sequestrations, the latter due specifically to the use of bone marrow nails, are discussed at length. The author concludes that his observations on the patients at the Kiel Clinic, as well as the successes with bone marrow nailing reported in the literature, justify the use of this method in the treatment of fresh open fractures and infected gunshot fractures. The manuscript, which is typewritten in German, is accompanied by a five-page bibliography, and contains four small tables and eighteen illustrations in the text.

PB 25487. HENNIG, G. R. Dr. Morio Yasuda, Department of Biochemistry, Hokkaido Imperial University: Laboratory inspection report. February, 1946. 2 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

This is a short report on studies carried on in the department of biochemistry. Some of them are published in *Nihon Seikagaku-Kaishi (Proceedings of the Japanese Biochemical Society)*, Volume 18, 1943. The topics are: (1) biochemical studies on phospholipid; (a) studies on the acetal phospholipid (plasmalogen), (b) on the existence of an amino acid in cephalin molecule, (c) on the structure of sphingosine; (2) on the physiological minimal requirement of ascorbic acid; (3) on the nutrition of the cold region (Hokkaido district) inhabitants; and (4) studies on milklipid. This work is reported by the 5250th Technical Intelligence Company.

PB 20776. KOBAYASHI, HARUJIRO. Parasites and parasitic diseases of Korea. No date. 22 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

The emphasis of this study, the result of thirty years' experience, is confined to morphology, systems, habits, and development of the parasites. It also contains remarks on epidemiology and control measures for the diseases caused by the various parasites. Parasitic diseases of highest incidence are amoebic dysentery, malaria, paragonimiasis, clonorchiasis, metagonimiasis, teniasis, ascariasis, ankylostomiasis, filariasis (elephantiasis especially on account of *Wuchereria malayi*). For all these diseases mention is made of the regional distribution. Under the heading medical entomology there are treated ticks and mites, the red bug, fleas, mosquitoes and flies. This document will not reproduce well.

PB 23314. MITCHELL, RAYMOND W., JUNIOR. Report on Chiba Hospital, 313 Inohana Chyo, Chiba, Chiba Prefecture. (A.F.P.A.C. Medical Technical Intelligence Field Report 3.) March, 1946. 44 pp. Price: Microfilm, 50c.; Photostat, \$3.00.

This report describes the history of the hospital, its organization, administration and medical personnel. Dr. Sadanobu Seo, the director of the surgical clinic, and his associates have done research on the following subjects: (1) surgical correction of strictures of the rectum caused by *lymphopathia venereum*; (2) surgical removal of the carotid bodies for Raynaud's disease; (3) interarterial injections for various conditions; (4) X-ray treatment; (5) surgical procedures on the oesophagus; (6) physiological surgery of the digestive tract. Attached are twelve photographs and the literal translations of the following papers: (1) treatment by the arterial-shock injection method; (2) surgery of the carotid gland; (3) a special lecture on the physiological operation of digestive organs.

PB 22148. STERN, SEYMOUR. Manufacture of anti-soft chancre bacillus vaccine, by Nitto Vaccine Sera Laboratory, Mukomachi, Kyoto Prefecture. (A.F.P.A.C. Medical Technical Intelligence Field Report 1.) March, 1946. 11 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

Intravenous injections are employed for acute cases, intramuscular for chronic cases. Although clinical investigation is insufficient to warrant proper evaluation, it was felt that the product should be investigated and the manufacturing process and other pertinent data be made a matter of record. An appendix gives the recommended usage.

PB 20792. GILMAN, ALFRED, *et alii*. The metabolic reduction and nephrotoxic action of tetrathionate in relation to a possible interaction with sulphhydryl compounds. No date. 22 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

Tetrathionate is rapidly reduced to thiosulfate *in vivo*; also, it is toxic to the renal tubule to a degree that moderate doses produce complete anuria within less than an hour. This report is concerned with the mechanisms by which the reduction of tetrathionate can be effected *in vivo* and its possible relationship to the nephrotoxic action. Tables appear throughout the report. Bibliography is included.

PB 20793. KAREL, LEONARD. The inhibition and potentiation of cellular agglutination by ricin, with a note on the toxicity of special preparations of ricin in mice. No date. 18 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

The report presents data indicating that agglutination of corpuscles *in vivo* cannot account for the toxicity of ricin, inasmuch as not enough red blood cells are destroyed to produce toxic effects; that, although immediate agglutination of erythrocytes and other cells by mixtures of serum, whole blood or lecithin and ricin is prevented, delayed agglutination does occur after sufficient incubation at body temperatures, and that ricin, treated with serum, increases in absolute toxicity, whereas lecithinized ricin, similarly treated, does not. All data reported are composite results of repeated determinations. Tables appear throughout the report. Bibliography is included.

PB 20794. KAREL, LEONARD, AND FRANKLIN, RICHARD C. The quantitative determination of ricin hemagglutination. No date. 21 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

This study was undertaken to attempt to establish a quantitative relationship between hemagglutination and ricin content as a means of determining the latter in the extremely low concentrations in which it is toxic. In the course of the work the sensitivity of erythrocytes to ricin was found greatly to exceed expectations. A quantitative relationship in the agglutination of guinea-pig erythrocytes by ricin has been established. Standard deviation was found to be $\pm 5.58\%$ with amounts as small as 1.0 microgram. Quantities of ricin as low as 10-12 micrograms have been detected. Table, bibliography and graphs are attached.

PB 18767. U.S. WAR DEPARTMENT. MEDICAL CORPS. Neurotropic virus diseases. (Tech. Bulletin MED 212.) January, 1946. 7 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

The subject matter has been divided as follows: introduction, classification and diagnostic features of principal neurotropic virus diseases; St. Louis encephalitis, Japanese B. encephalitis, Russian spring-summer encephalitis, eastern equine encephalomyelitis, western equine encephalomyelitis, lymphocytic choriomeningitis, poliomyelitis and mumps meningoencephalitis. Other divisions are: less common infections of central nervous system, diagnostic procedures, and the collection and shipment of specimens.

PB 22993. COREY, E. L., AND WEBSTER, A. P. Design of safety diving equipment. (Bur. of Medicine and Surgery Res. Project X-107.) August, 1943. 9 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

This report summarizes the work that was done on testing an automatic pressure-regulating valve as a means of governing the pressure within a diving dress in such manner as to prevent divers' "squeeze" attributable to accidental under-water falls. The following conclusions were reached: (1) a pressure-regulating, anti-squeeze valve, by-passing the diver's manual air valve, can be made to automatically deliver a sufficient amount of air so that squeeze does not take place from under-water falls up to 40 feet; (2) a small, compact valve operated by a pressure disk instead of a simple diaphragm would be better than the large and bulky valve used in the tests; and (3) use of sea water pressure for operation of an anti-squeeze valve is probably the most practical means of actuating the mechanism. Two enclosures are attached to the report: (1) an analysis of divers' "squeeze" and (2) suggested means by which divers' "squeeze" may be prevented.

PB 22992. COREY, E. L., AND WEBSTER, A. P. Field study of the effects of benzedrine on small arms firing under conditions of acute fatigue. (Bur. of Medicine and Surgery Res. Project X-120.) June, 1943. 73 pp. Price: Microfilm, \$1.00; Photostat, \$5.00.

One hundred men were kept continuously active for sixty consecutive hours, half the group receiving benzedrine sulphate medication and half receiving a placebo. This report contains a detailed description of this study of the effects of benzedrine on accuracy of small arms firing under conditions of fatigue. It was found that benzedrine had no deleterious effects and that the administration of benzedrine resulted in superior firing performance. Tables and charts present test data. This report comes from the U.S. Naval Research Institute, National Naval Medical Centre, Bethesda, Maryland.

British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held on November 28, 1946, at the Institute of Medical and Veterinary Science, Adelaide, Dr. L. R. MALLEN, the President, in the chair.

Venous Thrombosis and Pulmonary Embolism.

DR. A. BRITTEN JONES read a paper entitled "Peripheral Venous Thrombosis: Preventive Measures and Treatment" (see page 297).

DR. G. A. LENDON, in opening the discussion, said that Dr. Britten Jones's paper had pointed out the frequency of thromboembolism, both in medical and in surgical cases, and suggested a method of preventing the condition, as well as a workable operation to cope with those cases in which prevention had failed. He went on to say that numerous as were the cases culled from the Royal Adelaide Hospital records, yet they probably represented only one-fifth of those which actually occurred. Dr. Lendon described various unusual forms of embolism and the vicarious routes by which the pulmonary circulation could be side-tracked, and concluded that he did not believe that all pulmonary emboli resulted in infarction. Preexisting pulmonary congestion made infarction more probable; but in the type of case discussed by Dr. Britten Jones, the embolus had to be of considerable size before it produced this end result.

DR. H. D. SUTHERLAND outlined four cases with which he had dealt. He stressed the possibility of lymphorrhoea in the type of case in which thrombophlebitis had extended up to and beyond the region of the femoral triangle. He also indicated that in an obese person, when the clot had extended beyond the femoral triangle, the periphlebitis and oedema surrounding the vessels in this region made the technical details relatively difficult, because definition of the fascial planes was almost completely disguised. Dr. Sutherland was also impressed with the subjective improvement in some cases immediately after operation and in others within the first twelve hours; the patients in all cases volunteered this information after the operation. Dr. Sutherland mentioned the Trendelenburg operation, and said that there were many reasons why one could not pin one's faith to this "last desperate measure", because it was a difficult operation which had to be conducted under rush conditions often without suitable preparation, and for this and other reasons it always carried an extremely high mortality rate. When these facts and the fact that the diagnosis could easily be wrong were taken into consideration, the Trendelenburg operation was not justifiable. Dr. Sutherland said that medical practitioners should be active in their attention to prophylactic details as outlined by Dr. Britten Jones, and in the event of the occurrence of phlebotrombosis or thrombophlebitis, they should immediately undertake the relatively simple measure of ligation and division of the superficial femoral vein.

DR. P. S. MESSENT spoke a word of caution with regard to the acceptance of new procedures. He quoted Dr. Britten Jones as saying that the risk of the operation was negligible, and said that the mortality rate was negligible but not the morbidity rate. He questioned the advisability of ligation of veins in the unaffected leg, and said that it was difficult to decide when this was indicated. Possibly it was too drastic.

DR. G. H. BURNELL said that in a period of two to five years at Massachusetts the mortality rate dropped by 20% irrespective of sulphonamide and penicillin. Ligation of the vessel was not easy when periphlebitis was present. He agreed with the principle of early mobilization.

DR. B. H. SWIFT stated that in some cases of "white leg" the swelling went down miraculously with four hours' continuous caudal anaesthesia. He questioned whether a patient who had had a "white leg" should have heparin before operation and whether it might cause haemorrhage.

Dr. Britten Jones said that he had used heparin only after operation, and even then not as a routine measure.

DR. I. A. HAMILTON remarked that the reason for femoral vein ligation was not wholly clear.

Dr. Britten Jones said that one reason was that recanalization sometimes took place.

DR. ROLAND BEARD asked whether intravenous treatment of varicose veins would have any ill effect subsequently during pelvic operation. He spoke of the dangers of keeping the patient too long in the Trendelenburg position, and of

the patient's remaining still with a high knee pillow for too long. He agreed with the principle of early movement.

Dr. Britten Jones said that emboli undoubtedly did occur as a result of injection of varicose veins. He also agreed with Dr. Messent that discrimination was necessary, because if all and sundry adopted the operative treatment the number of complications would increase.

DR. A. F. HOBBS said that he often wondered whether thrombophlebitis might cause trouble when fluids were given by the intravenous drip method.

Dr. Britten Jones said that he had not yet encountered such emboli, but he was expecting them.

Dr. Mallen, from the chair, thanked Dr. Britten Jones for his paper and those who had contributed to the discussion.

NOTICE.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioners have been released from full-time duty with His Majesty's Forces and have resumed civil practice as from the dates mentioned:

Dr. B. Fisher, 183, Macquarie Street, Sydney (January 5, 1947).

Dr. N. C. Newton, 185, Macquarie Street, Sydney (February 18, 1947).

Dr. W. A. Bye, 143, Macquarie Street, Sydney (February 10, 1947).

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 28, of February 13, 1947.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH (SEA-GOING FORCES).

Appointment.—Surgeon Lieutenant-Commander Kenneth Charles Armstrong, Emergency List, is appointed to the Permanent List in the rank of Surgeon Lieutenant-Commander, with seniority in rank of 2nd December, 1944, dated 23rd December, 1946.

AUSTRALIAN MILITARY FORCES. Australian Army Medical Corps.

SX21586 Lieutenant-Colonel C. B. Sangster is transferred to the Reserve of Officers (Australian Army Medical Corps), 13th November, 1946.

NX244 Lieutenant-Colonel (Temporary Colonel) D. W. McCredie, M.C., relinquishes the rank of Temporary Colonel and is placed upon the Retired List with the rank of Lieutenant-Colonel and with permission to wear the prescribed uniform, 9th August, 1946 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 217 of 1946, promulgated in *Commonwealth Gazette* No. 200 of 1946).

SX34523 Lieutenant-Colonel C. Yeatman, O.B.E., is placed upon the Retired List with permission to retain his rank and wear the prescribed uniform, 30th November, 1946.

Reserve of Officers.

The undermentioned officers are transferred to the Reserve of Officers on the dates indicated. Where applicable they cease to be seconded and relinquish any temporary rank held with effect from the date of transfer to the Reserve of Officers.

Captains VX132691 A. R. Long and VX150049 L. P. Gill, 5th November, 1946.

160th Australian General Hospital.—N429324 Captain (Temporary Major) I. B. Jack, 5th November, 1946.

No. 110 (Perth) Military Hospital.—QX64246 Captain J. C. Fraser, 31st October, 1946.

No. 112 (Brisbane) Military Hospital.—QX64216 Captain J. R. Turner, 29th October, 1946.

No. 113 (Concord) Military Hospital.—Captains NX117597 J. S. Windeyer, 9th November, 1946, VX111104 D. H. Waterworth, 1st November, 1946, and Q273985 L. T. Jobbins, 30th October, 1946.

No. 115 (Heidelberg) Military Hospital.—Captains TX6274 J. A. Hede, 12th November, 1946, and VX92010 M. Bunn and VX111106 J. M. Lister, 5th November, 1946.

50th Australian Camp Hospital.—VX112177 Captain A. F. Agnew, 5th November, 1946.

70th Australian Camp Hospital.—NX203192 Captain R. I. Eakin, 9th November, 1946.

2nd Australian Outpatients' Depot.—VX134814 Captain G. S. Christie, 5th November, 1946.

Inter-Service Medical Wing Demobilization Centres (Australian Military Forces Component).—Captains VX94864 C. W. Ahern, 14th November, 1946, and VX91460 G. G. Champion and VX114259 P. L. McNeill, 5th November, 1946.

TX15108 Captain F. W. Walton, 15th November, 1946.

101st Australian General Hospital (Australian Imperial Force).—NX170706 Major W. J. Pullen, 19th November, 1946, and NX149558 Captain R. B. Kendall, 26th November, 1946.

No. 105 (Adelaide) Military Hospital.—SX33403 Captain H. S. Blackburn, 28th November, 1946.

No. 113 (Concord) Military Hospital.—NX203294 Captain (Temporary Major) J. Colclough and Captains NX203583 R. G. Epps, 22nd November, 1946, NX100094 H. Busby, M.C., 19th November, 1946, and NX203649 J. C. Fitzherbert, 22nd November, 1946.

28th Australian Camp Hospital.—TX9443 Captain L. H. Wilson, 5th December, 1946.

1st Australian Outpatients' Depot.—NX201708 Captain T. D. Hollywood, 21st November, 1946.

2nd Australian Outpatients' Depot.—TX6485 Captain R. J. Botcher, 19th November, 1946.

Inter-Service Medical Wing Demobilization Centres (Australian Military Forces Component).—VX94675 Captain N. Chenhall, 3rd December, 1946.

Retired List.

The undermentioned officer is placed upon the Retired List on the date indicated with permission to retain his present substantive rank and wear the prescribed uniform:

118th Australian General Hospital (Australian Imperial Force).—TX6261 Captain J. D. Trembath, 26th October, 1946.

Reserve Citizen Military Forces.

2nd Military District.—Honorary Captain K. J. Collins is retired, 29th November, 1946.

3rd Military District.—The resignation of Honorary Captain P. D. G. Fox of his commission is accepted, 20th November, 1946.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

The appointments of the following officers are terminated on demobilization: Temporary Squadron Leader F. I. Wooten (261198), 3rd January, 1947, Flight Lieutenant V. T. Stephen (257670), 23rd December, 1946, B. T. Dowd (267562), 7th January, 1946, Flight Lieutenant (Acting Squadron Leader) P. J. Bird (255169), 15th January, 1947, Flight Lieutenants A. Bardsley (257498) and W. G. MacGregor (257506), 15th January, 1947.

Reserve: Medical Branch.

The following ex-officers are appointed to commissions with the temporary ranks as shown: Squadron Leader Frederick Ismay Wooten (261198), 4th January, 1947, Flight Lieutenant Bryan Thomas Dowd (267562), 8th January, 1947.—(Ex. Min. No. 13—Approved 12th February, 1947.)

The following ex-officers are appointed to commissions with the rank of Flight Lieutenant, 16th January, 1947: Alfred Bardsley (257498), Peter James Bird (255169).—(Ex. Min. No. 14—Approved 12th February, 1947.)

Special Correspondence.

CANADA LETTER.

FROM OUR SPECIAL CORRESPONDENT.

ANOTHER book has appeared recently in Canada on the life of Sir Frederick Banting, of insulin fame, this one by Margaret Mason Shaw, who spent eleven years in close association with the rather talented painter and unusual figure who did so much for the world's diabetics. This biography supplements another by Harris, now being widely read. Hart House, the Men's Union on the University of Toronto campus, has assembled an excellent set of coloured photo reproductions of Banting's many paintings.

Incredible as it may seem, the city of Vancouver, B.C., has abandoned chlorination of water which Federal wartime regulations required. Accordingly, the United States

Public Health Service has forbidden the use of Vancouver water on all American trains and aeroplanes entering Canada. A most rabid and intolerant anti-chlorination league has been at work in Vancouver, and all that remains now is to have a really good water-borne epidemic to cap the story. The bears on the city watersheds will soon be coming out of hibernation and the *Bacillus coli* count will take its annual rise.

Cancer research in Canada has recently been given a boost by the trustees of the three-quarter million dollar George V Cancer Fund, who are going to coordinate and press forward cancer research in our universities. In the United States public opinion is becoming aroused over the recent disclosure that cancer annually kills twice the number of Americans killed in the entire second world war. The Growth Committee of the American National Research Council is sponsoring a system of fellowships to enable suitable young medical and surgical specialists to enter the field of neoplastic diseases as their life work. At present they have put about \$50,000 into fellowships and \$320,000 into research. The American Cancer Society has undertaken to raise the money needed for this venture, and has an annual objective of \$12,000,000. The atomic bomb has made people research-minded. Researchers are busy reminding the public that one billion dollars were spent on that destructive enterprise, and by inference they would like a little backing for constructive effort. At the moment it is a shame that in some cancer institutes the director spends one-quarter of his time soliciting funds.

Professor Boris Babkin has retired from his chair in physiological research at McGill University and is now completing an exhaustive biography of Pavlov.

Dr. Omond Solandt, scientific advisor to the Chiefs of Staff at Ottawa, has recently been lecturing on atomic energy and his observations at Hiroshima. The National Research Council of Canada is proceeding with a large pile of development at Chalk River, Ontario, which will eventually produce radioactive elements for biological researchers, through Dr. Andre Clapian, chief of the biological sciences branch of the Atomic Research Group.

Post-graduate study in Canadian hospitals has greatly increased owing to the arrival of many European teachers who survived the war and its privations. The Rockefeller Foundation has been most generous in assisting promising teachers in European schools to study for a time in Canada before taking up their professorial duties at home. Dr. R. R. Struthers, formerly professor of pediatrics at McGill, has been appointed to the staff of the Rockefeller Foundation in Paris following a distinguished period of service with UNRRA. A teaching mission to Prague was sent from the U.S.A. recently, headed by Dr. Paul White, the cardiologist from Boston. The greatest interest was displayed in this good-will and good-medicine gesture on behalf of the American profession.

Correspondence.

PEPTIC ULCER.

SIR: As Dr. Doyle found my letter and figures (THE MEDICAL JOURNAL OF AUSTRALIA, January 25, 1947, page 125) to lack clarity in some respects, I will try to be more explicit. The division of the cases into two groups was purely an arbitrary one and there was not a great difference in severity as shown by haemoglobin values. The average haemoglobin of the 92 patients given unmodified blood only, by direct transfusion, was 45%, and the average haemoglobin of the thirty patients given both direct and indirect transfusion was 38%. Incidentally, on checking these figures, I found an error in arithmetic, and the average haemoglobin for the total group should read 43%. The average amount of blood given by the direct method (900 cubic centimetres) would be sufficient to bring the haemoglobin up to 60%, which is the figure I usually aim at.

Dr. Doyle's deduction that most of the 92 patients treated with unmodified blood only were never at any time a surgical problem, is rather out of keeping with his proposal that all cases of haematemesis should be admitted to surgical wards.

With regard to the group of patients given both direct and indirect transfusion, all except two patients had been given massive transfusions of citrated blood before I saw them. I have reported several of these cases (THE MEDICAL JOURNAL OF AUSTRALIA, September 13, 1941, page 281, and December 4, 1943, page 461). In one instance a young woman was given eighteen pints of citrated blood over a period of eight days; I was called in after a surgeon had pronounced operative risk as too great; her haemoglobin was then 30%

and the systolic blood pressure was 80 millimetres of mercury; she was given three direct transfusions over a period of four days and recovered. I would not expect to treat successfully by transfusion a hæmorrhage from a large artery, but I do not consider that the eroded vessel in a peptic ulcer comes under that category.

Dr. W. A. Hailes in his article on secondary hæmorrhage (*The Australian and New Zealand Journal of Surgery*, Volume XVI, Number 1, July, 1946, page 39) was considering the treatment of hæmorrhage from large peripheral arteries. He stated that "bleeding from small branches of the main trunks will often cease spontaneously". I have histological sections of eroded arteries from peptic ulcers, in which, when direct transfusion of unmodified blood had been given, the lumen was completely occluded by organizing thrombosis, whereas in similar sized arteries, in cases treated by citrated blood, the thrombus which had been present was not adherent to the vessel wall and was displaced in the preparation of the section.

The one serious criticism of direct transfusion mentioned by Dr. Doyle, namely, the difficulty in getting enough donors, has not been a handicap in Melbourne. Blood, whether it comes from the bank, or from the donor in person, has been supplied with equal celerity and efficiency by the Red Cross Blood Transfusion Service—and relatives and friends rally round when it is a matter of life and death.

In conclusion, I will quote a passage from your "Current Comment" (*THE MEDICAL JOURNAL OF AUSTRALIA*, January 18, 1947, page 82), which Dr. Doyle advised me to read. Referring to important recent advances, it is stated: "These, together with increasing vigilance and enthusiasm on the part of physicians, have reduced medical mortality to such a low level as to necessitate the greatest caution before surgery is advised."

Yours, etc., JOHN MCLEAN.

"Chelmer",
417, Saint Kilda Road,
Melbourne.
February 21, 1947.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

THE Post-Graduate Committee in Medicine in the University of Sydney in conjunction with the Blue Mountains Medical Association will hold a week-end course at Katoomba on Saturday and Sunday, March 15 and 16, 1947. The course will be held in the Lecture Room of the Blue Mountains District and Anzac Memorial Hospital.

Saturday, March 15, 1947.

2 p.m.—Registration.

2.30 p.m.—"Blood Dyscrasias", Dr. T. M. Greenaway.

4 p.m.—"Infections of the Hand", Dr. V. J. Kinsella.

Sunday, March 16, 1947.

10 a.m.—"Delayed Labour", Dr. T. Dixon Hughes.

11.30 a.m.—"The Avoidance of Hospital Infections", Dr. V. J. Kinsella.

2.30 p.m.—"Coronary Disease", Dr. T. M. Greenaway.

4 p.m.—"Implications of the Rh Factor in Practice" and "Vaginal Discharges", Dr. T. Dixon Hughes.

The fee for the course will be £1 ls. There will be no charge for members of the defence forces. Those wishing to attend are requested to notify Dr. Nicholas Larkins, Honorary Secretary, Blue Mountains Medical Association, Katoomba, as soon as possible.

Medical Practice.

RADIOACTIVE ISOTOPES.

THE following statement is published at the request of the Acting Director-General of Health, Canberra.

Owing to the limited supply of radioactive isotopes, a Tracer Element Research Committee has been appointed from officers of the Council for Scientific and Industrial Research and the Commonwealth Department of Health, through its X-ray and radium laboratory, so that supplies may be obtained and distributed through one channel.

It would be appreciated if the following note for the information of the profession could be published in *THE MEDICAL JOURNAL OF AUSTRALIA*:

Certain radioactive isotopes produced as a by-product of atomic energy experiments are being used in research and in the treatment of some human diseases. At present, the only supply available to Australia is from overseas sources. The allocation there is, however, strictly controlled and supplies are being released only to accredited people who have to submit full details of the use to which the material will be put. Details of the arrangements which have been made for supplies to Australian users can be obtained from the Secretary, Tracer Element Research Committee, Council for Scientific and Industrial Research, Albert Street, East Melbourne.

As regards treatment, the two isotopes most in demand are phosphorus and iodine, which are claimed to be of value in certain types of leukaemia and diseases of the thyroid gland respectively, but which are reported to be valueless (and even possibly dangerous) in other types. Because of this, the supplying organization requires information regarding the use which is to be made of the isotope applied for. A recent statement by an American authority on the types of cases in which radioactive phosphorus and iodine are of value, together with references to the literature, can be obtained on application to the Commonwealth X-Ray and Radium Laboratory, University Grounds, Carlton, N.3, Victoria.

The Royal Australasian College of Surgeons.

THIRD AWARD OF GORDON CRAIG SCHOLARSHIPS.

THE Council of the Royal Australasian College of Surgeons announces that after consideration of the applications for the third award of Gordon Craig Scholarships, the following awards have been made:

1. Kevin Nicholas McNamara, New Zealand: Travelling Scholarship.
2. Vernon Stewart Howarth, New South Wales: Scholarship for work in Australia.
3. John Laidley Dowling, New South Wales: Travelling Scholarship.
4. Ronald Francis Lowe, Victoria: Travelling Scholarship.
5. George Swanson Christie, Victoria: Scholarship to be devoted partly for work in Australia and partly for work overseas.
6. George Stretton Gunter, Victoria: Scholarship for work in Australia.
7. James Warrick Francis Macky, New Zealand: Travelling Scholarship.
8. Henry Dendy Moore, New South Wales: Travelling Scholarship.

Obituary.

GEOFFREY HAMPDEN VERNON.

We are indebted to Dr. Bruce Robinson for the following tribute to the late Dr. Geoffrey Hampden Vernon.

Although it is some time since Dr. Geoffrey Hampden Vernon died, it would not be fitting to let his passing remain unnoticed, for as his friends well knew he was a remarkable man and one who left his imprint on the memory of all who met him.

He was born in Hastings, England, on December 16, 1882, being the younger son of Colonel W. L. Vernon. He graduated in medicine at the University of Sydney in 1905. After a residence at Prince Alfred Hospital, Sydney, he practised for some years at different country towns in New South Wales and Queensland. He enlisted in the first World War and served with the 11th Australian Light Horse, winning a Military Cross during the Palestine Campaign for caring for wounded under fire. Later he was mentioned in despatches. After the Armistice of 1918 he went to Thursday Island where he was Government Medical Officer until 1934. He then bought a trading store at Daru in Western Papua where he lived until 1938 when he accepted the position of Government Medical Officer at Misima, Papua, where he was stationed until he volunteered for service

in the war that has just ended. He became a member of A.N.G.A.U. on February 25, 1942.

During the Papuan Campaign his name became legendary as a medical officer in charge of sick natives, and his notable work on the Kokoda Trail from June to November, 1942, led to a further mention in despatches. His strength of mind and body and his devotion to his duty during those terrible months were more than could have been expected from a man of half his age. He kept a diary of those months and those who have been privileged to read it have found it an epic. His work was done with the most primitive of equipment and the smallest of pharmacopoeias, but his black patients had a friend better than they could have known.

Although I had heard of this wonderful old man on many occasions, I did not meet him until the Papuan Campaign was nearly over. It was at a native hospital at Poppindetta in the Buna-Gona area. He was then a tall thin man looking more than his age—his great work and repeated bouts of fever and other illness had left their mark. His voice was rather hoarse and a deafness that had followed concussion while on active service in 1915 had persisted. I found him very modest and charming and though he was tired and busy, he found time to show me much of the work he and his native orderlies were doing for his two hundred patients.

He was transferred to the Reserve of Officers on March 4, 1946, and retired in April to a plantation at Port Glasgow, Papua, with his sister, his niece—to whose kindness I am indebted for many of the details written here—and her husband. It was hoped that there he would have leisure for gardening and writing—his two favourite means of relaxation. Early in the next month he developed a fever that did not make the usual response to quinine and he was taken by launch to Samarai where he died two days later on May 16, 1946, of a chronic pulmonary infection.

He never married, and of those mentioned above only his niece Mrs. Marcia Russell now remains. The others have followed him on.

He had lived a full life and his last work was a great one. He represented a type not commonly found, the combination of wiry toughness with gentleness. We saw the triumph of a resolute courageous spirit over a tired sick body, and all felt their lives enriched by knowing him. All his friends will regret that he was unable to spend a few more years in the leisure he so surely earned.

FOURNESS BARRINGTON.

We are indebted to Dr. Herbert Schlink for the following appreciation of the late Dr. Fourness Barrington.

By the passing of Mr. Fourness Barrington the medical profession and the ailing women of this country have suffered a great loss. Few men have been so conscientious in their service as he.

Fourness Barrington received his school education in Sydney and proceeded to Edinburgh University, where he obtained his M.B., M.S. Upon his return to Sydney he entered private practice for a short time, but soon returned to England, where he carried out post-graduate study at Saint Bartholomew's Hospital and was admitted a Fellow of the Royal College of Surgeons. Having accomplished his English Fellowship, he remained in London for further studies in gynaecology and obstetrics.

Arriving back in Sydney, he was appointed an honorary gynaecologist to Lewisham Hospital, and in 1906 joined the staff of the Prince Alfred Hospital as junior gynaecological surgeon to Mr. Edward Thring. He became a senior surgeon in 1920 and an honorary consulting surgeon in 1924. He was appointed lecturer in obstetrics at the University of Sydney in 1913, a position he held until he changed to the lectureship in gynaecology in 1921. He was a Foundation Fellow of the Royal Australasian College of Surgeons.

As a surgeon he was neat and efficient, punctual and safe. His clinical demonstrations were well prepared and made understandable to even the dullest of students. As a lecturer at the university he set a standard which is talked of wherever his students forgoth even to this day. He held the lectureship in gynaecology until the age of retirement and was then appointed to Saint Vincent's Hospital which he served for many years.

Barrington had a full life in the twin specialities and the Sydney school was fortunate to have had such an outstanding man devoted to them. Personally he was a quiet retiring man, but had a keen sense of humour. He was kind, courteous and sympathetic, and above all punctilious in regard to his public hospital duties and attendances. He belonged to the old Bartholomew's circle of such men as

Clubbe, Gillies *et cetera*, and in his work lived up to every good tradition of that great school of medicine.

Socially he was a prominent member of the Australian Club and Royal Sydney Golf Club and much liked and respected by his fellow members. He also had quite a large circle of friends amongst the anglers of the State.

In the Royal Prince Alfred Hospital, where he spent most of his professional life, he endeared himself not only to his colleagues, his patients, the nurses and students, but also to those of the lay staff with whom he came in contact. It will be many a day before his memory in this old professional home will fade. His colleagues, students and the whole staff join in offering sympathy to his family.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act, 1933-1939*, of New South Wales, as duly qualified medical practitioners:

Blake, Leo, M.B., B.Ch., 1916 (National Univ. Ireland), c.o. Bank of New South Wales, Sydney.
Clarke, Desmond Patrick, L.A.H., 1945 (Univ. Dublin), 400, Chapel Road, Bankstown.
Schallt, Ivan Abraham, M.B., B.S., 1935 (Univ. Melbourne), D.A., R.C.P. and S. (England) (1945), 6, Etham Avenue, Darling Point.
Sullivan, John Patrick, M.B., B.S., 1945 (Univ. Melbourne), The Rock.
Woolcock, William John Patrick, M.B., B.S., 1940 (Univ. Sydney), 1946, M.R.A.C.P., Hampton Court, King's Cross.

The following additional qualifications have been registered:

Fulton, John Charles (M.B., B.S., 1933, Univ. Melbourne), D.P.H., 1946, Univ. Sydney.
Lee, Ernest William (M.B., B.S., 1941, Univ. Sydney), Dip. Rad., 1946, Univ. Sydney.
Orr, Robert Hargreaves (M.B., 1943, Univ. Sydney), B.S., 1943, Univ. Sydney.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1939 to 1946*, of Queensland, as duly qualified medical practitioners:

Farmer, Donald Fordyce, M.B., B.S., 1944 (Univ. Sydney), 116, Russell Street, Toowoomba.
Preston, Stewart Horton Delbridge, M.B., B.S., 1942 (Univ. Melbourne), 27, Alexandra Street, North Ward, Townsville.
Roe, William Arthur Allport, M.B., B.S., 1942 (Univ. Queensland), c.o. Mr. R. Roe, Bent Street, Toowoomba, Brisbane.

The following additional qualification has been registered:

Uhd, Karl Neilson, c.o. X-Ray Department, General Hospital, Brisbane, D.D.R., 1946 (Univ. Melbourne).

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Hession, George Edward, M.B., B.S., 1946 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.
Strauss, Hugo, approved for registration in terms of Section 17 (B) of the *Medical Practitioners Act, 1933*, on January 2, 1947, Bulahdelah, New South Wales.

The undermentioned have been elected as members of the New South Wales Branch of the British Medical Association:

Dimond, Charles Major, M.B., B.S., 1945 (Univ. Sydney), 8, Bromley Flats, Gladwood Gardens, Double Bay.
Docker, Ernest Brougham, M.B., B.S., 1937 (Univ. Sydney), 193, Bourke Street, Goulburn.
Fisher, Bernard, registered in terms of Section 17 (B) of the *Medical Practitioners Act, 1933*, on January 2, 1947, 183, Macquarie Street, Sydney.

Fraser, Wallace Hugh, M.B., B.S., 1931 (Univ. Sydney), 217, Macquarie Street, Sydney.
 Garven, Allison Kinneer, M.B., B.S., 1946 (Univ. Sydney), 20, Beaufort Court, Forbes Street, Darlinghurst.
 Hannam, William Henry, M.B., 1946 (Univ. Sydney), Main Street, Lithgow.
 Hanson, Herbert Victor, M.B., Ch.M., 1925 (Univ. Sydney), 56, Stanhope Road, Killara.
 Horsley, Roberta Gertrude, M.B., B.S., 1945 (Univ. Sydney), Manly District Hospital, Manly.
 Hudson, Catherine Amy, M.B., B.S., 1946 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.
 Kilburn, Helen Patricia, M.B., B.S., 1942 (Univ. Sydney), 22, Bertram Street, Chatswood.
 Loebel, Robert, registered in terms of Section 17 (B) of the *Medical Practitioners Act*, 1938, 47-49 Bayswater Road, King's Cross.
 Manzie, Peter Podmore, M.B., B.S., 1945 (Univ. Sydney), Newcastle General Hospital, Newcastle.
 Olivier, Norma Mary, M.B., B.S., 1944 (Univ. Sydney), Talbot, Manford Place, Cremorne.
 Moylan, William Anthony, provisional registration, 1946 (Univ. Sydney), District Hospital, Auburn.
 Nagy, Gabriel Stephen, M.B., B.S., 1946 (Univ. Sydney), Sydney Hospital, Sydney.
 O'Donnell, Thomas Henry, M.B., B.S., 1942 (Univ. Sydney), 7, Kingsland Road, Strathfield.
 Palmer, Calvin Henry, provisional registration, 1946 (Univ. Sydney), Lismore Base Hospital, Lismore.
 Reval, Arthur, registered in terms of Section 17 (B) of the *Medical Practitioners Act*, 1938, 135, Macquarie Street, Sydney.
 Shaw, William Robert Morgan, M.B., B.S., 1946 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
 Wyke, Barry Darrell, M.B., B.S., 1945 (Univ. Sydney), Department of Surgery, University of Sydney, Sydney.

Medical Appointments.

Dr. Vere Franklin has been appointed medical officer of health to the Toodyay Road Board, Western Australia, under the provisions of *The Health Act*, 1911-1944.

Dr. W. J. W. Close has been appointed a member of the Dental Board of South Australia under the provisions of the *Dentists Act*, 1931-1936.

Dr. B. H. Lewis has been appointed government medical officer at Gundagai, New South Wales.

Dr. L. G. Teece has been appointed a member of the Physiotherapists Registration Board, New South Wales.

Dr. J. B. Thiersch has been appointed honorary clinical assistant to the radiological section of the Royal Adelaide Hospital, Adelaide.

Dr. O. W. Leitch has been appointed honorary medical officer of the Port Pirie Hospital, South Australia.

Dr. G. S. Gurney has been appointed government medical officer at Bundanoon, New South Wales.

Books Received.

"Acidosis: Clinical Aspects and Treatment with Isotonic Sodium Bicarbonate Solution", by Esben Kirk, M.D., 1946. Copenhagen: Einar Munksgaard, Norregade 6; London: William Heinemann Medical Books, Limited. 9½" x 6", pp. 226. Price: 18 Kroner.

"The Background of Infectious Diseases in Man", by F. M. Burnet, M.D., F.R.S., 1946. Melbourne: The Melbourne Permanent Post-Graduate Committee. 7½" x 4½", pp. 118.

"Hypometabolism: A Clinical Study of 305 Consecutive Cases", by Esben Kirk, M.D., and Sven Ancher Kvorning, M.D., 1946. Copenhagen: Einar Munksgaard; London: Heinemann Medical Books Limited. 9½" x 6½", pp. 84, with illustrations. Price: Danish Cr. 7.25.

"Diagnosis and Treatment of Menstrual Disorders and Sterility", by Charles Mazer, M.D., F.A.C.S., and S. Leon Israel, M.D., F.A.C.S.; Second Edition; 1946. New York, London: Paul B. Hoeber, Incorporated. 9½" x 6½", pp. 584, with many illustrations. Price: \$7.50.

"The M.B., B.S. Finals", by Francis Mitchell-Heggs, T.D., M.B., B.S. (London), F.R.C.S. (Edinburgh); Third Edition; 1947. London: J. and A. Churchill, Limited. 8" x 5½", pp. 116. Price: 8s. 6d.

"Minor Surgery", by Cecil Flemming, O.B.E., M.Ch., F.R.C.S.; Twenty-Third Edition; 1946. London: J. and A. Churchill, Limited. 7½" x 4½", pp. 414, with many illustrations. Price: 14s.

"Edinburgh Post-Graduate Lectures in Medicine", Volume Three; 1946. Edinburgh, London: Oliver and Boyd. 9" x 6", pp. 606, with illustrations. Price: 15s.

"The Care of Young Babies", by John Gibbens, M.B. (Cambridge), M.R.C.P. (London), with a foreword by Sir Robert Hutchison, Bt., M.D. (Edinburgh), F.R.C.P. (London); Second Edition; 1946. London: J. and A. Churchill, Limited. 7½" x 5", pp. 214, with illustrations. Price: 5s.

"Diseases of Infancy and Childhood", by Wilfrid Sheldon, M.D. (London), F.R.C.P. (London); Fifth Edition; 1946. London: J. and A. Churchill, Limited. 8½" x 5½", pp. 584, with many illustrations. Price: 30s.

Diary for the Month.

MARCH 11.—Tasmanian Branch, B.M.A.: Ordinary Meeting.
 MARCH 11.—New South Wales Branch, B.M.A.: Medical Policies Committee, Ethics Committee.
 MARCH 14.—Queensland Branch, B.M.A.: Council Meeting.
 MARCH 17.—Victorian Branch, B.M.A.: Finance Meeting.
 MARCH 19.—Western Australian Branch, B.M.A.: General Meeting.
 MARCH 20.—Victorian Branch, B.M.A.: Executive Meeting.
 MARCH 25.—New South Wales Branch, B.M.A.: Council Quarterly.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health); Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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